

Dr. Charles H. Blake reported the collection of *Wolffiella floridana* (J. D. Sm.) Thompson from Farrer's Pond, Lincoln, on August 11, 1937.—R. J. EATON, Cambridge, Mass.

MONOGRAPHIC STUDIES IN THE GENUS *ELEOCHARIS*—V

H. K. SVENSON

(Continued from page 19)

Series 4: OVATAE

38. *E. obtusa* (Willd.) Schultes [PL. 540, FIGS. 1, 6, 7; MAP 43]; Svenson, *RHODORA* xxxi. 214 (1929).—Noteworthy citations: FLORIDA: in swamp, Welton Co., *Curtiss* in 1885 (NY); Tallahassee, *N. K. Berg* (NY). TEXAS: Uvalde, *Plank* in 1891 (NY); Houston, *Plank* in 1891 (NY). NEW MEXICO: Las Vegas, *Plank* in 1895 (NY).

39. *E. ovata* (Roth) R. & S. [PL. 540, FIG. 4; MAP 44]; Svenson, *RHODORA* xxxi. 211 (1929). *E. diandra* C. Wright, Bull. Torr. Club. x. 101 (1883) [PL. 540, FIG. 3]; Svenson, *RHODORA* xxxi. 210 (1929).

Wright, apparently not knowing true *E. ovata* as represented in America, compared his plants from the sand-bars of the Connecticut River only with *E. obtusa*. In my opinion, *E. diandra* represents a form of *E. ovata* in which the bristles are rudimentary or lacking. Such a variation, usually of little significance in *Eleocharis*, is found in *E. ovata* in several river valleys. But specimens from the Hudson estuary usually have bristles, and except for the pallid spikelets are indistinguishable from typical *E. ovata*.

40. *E. engelmanni* Steud. [PL. 540, FIG. 2; MAP 45]; Svenson, *RHODORA* xxxi. 208 (1929).—Additional citations: WEST VIRGINIA: Minnehaha Springs, Pocahontas Co., *Core* in 1931 (W Va Univ). TEXAS: Dallas, *Reverchon* no. 3596 (NY).

41. *E. lanceolata* Fernald [PL. 540, FIG. 5]; Svenson, *RHODORA* xxxi. 207 (1929).

Series 5: MACULOSAE¹

42. *E. maculosa* Vahl [MAP 25]; Svenson, *RHODORA* xxxi. 238 (1929). *E. Lehmanniana* Boeckl. in Engler, Bot. Jahrb. viii. 205 (1887).—Central America, West Indies and South America. Additional citations: GUATEMALA: Coban, 1350 m., *Tuerckheim* no. 1252 (NY). GUADALOUPE: *Richard* (TYPE, Cop); *Duss* nos. 3125 (NY), 3595 (NY). MARTINIQUE: *Duss* nos. 4137 (NY), 4522 (NY). DOMINICA: *F. E. Lloyd* no. 182 (NY). ECUADOR: *Lehmann* no. 138 (US, COTYPE of *E.*

¹ For key to species see *RHODORA* xxxi, 224 (1929).

Lehmanniana); Galapagos Ids., *Svenson* no. 135 (B). COLOMBIA: Santa Elena, Dept. Antioquia, *Archer* no. 1226 (US). BOLIVIA: Apolo, 4800 ft., *R. S. Williams* no. 914 (NY). BRAZIL: Therezapolis, Rio de Janeiro, *L. H. Bailey* no. 1270a (NY); Campos de Jordão, São Paulo, *Bailey* no. 844 (NY); Butantan, São Paulo, *Hoehne* no. 5424 (G).

The type of *E. maculosa* in Vahl's herbarium is an elongate slender specimen, the culm dark-spotted by aquatic debris or by a fungus. *E. Schottiana* (Berlin, hb. *Nees* no. 1710) is the many-flowered phase, common in Southern Brazil, with firm appressed erose scales.

43. *E. FUSCOPURPUREA* (Steud.) H. Pfeiff. (MAP 20). Dwarf, perennial from a creeping rootstock; culms filiform, somewhat thickened, 2–7 cm. high: sheaths reddish-purple, whitened-membranous and lacerate at the apex: spikelets ovate, obtuse, 3–3.5 mm. long, 2 mm. wide: scales purplish-brown, obtuse, strongly convex, with greenish-white tips, the lowermost with a broad white midrib: style 2-fid.: achene¹ biconvex, 1.0 mm. long, obovate, dull purple with a rugose surface: style-base yellowish-green, conic, not subulate; bristles white, opaque, equalling the achene.—Fedde, *Rep. Spec. Nov.* xxviii. 19 (1930). *Isolepis fuscopurpurea* Steud. *Syn. Cyp.* 99 (1855). *H. univaginata* Boeckl. *Cyp. Nov.* i. 14 (1888), e descr. *H. hyalino vaginata* Boeckl. *Allg. Bot. Zeit.* 1896. 52 (1896). *H. vincentina* Philippi, *Anal. Univ. Chil.* xciii. 349 (1896); C. B. Clarke in Engler, *Bot. Jahrb.* xxx. Beibl. 68: 18 (1901), with synonymy; *Svenson*, *RHODORA* xxxi. 239 (1929). *E. vincentina* var. *arcuata* (Kunze) C. B. Clarke (op. cit.) p. 19.—CHILE: Corral, Valdivia, *Philippi* no. 265 (TYPE, Paris); San Vincente, *Poeppig* (Paris, COTYPE of *E. arcuata*); Talcahuano, *Poeppig* (*C. Gay* no. 282, Paris). ARGENTINA: Rio del Valle, Catamarca, *Venturi* no. 6248 (US, B) (questionable).

E. fuscopurpurea has probably been derived from *E. maculosa*, differing in small stature and reduced style-base. The type is mixed with material of a nondescript plant of the *Dombeyana* group, from which Steudel may have described the style as 3-fid. The best representative of *E. fuscopurpurea* at Paris is *Gay* no. 282.

44. *E. DEBILIS* Kunth [PL. 543, FIG. 4]; *Svenson*, *RHODORA* xxxi. 240 (1929).

The TYPE of *E. debilis* at Berlin (Rio de Janeiro, 1814–15, ex reliquiis Sellowiani. *Humboldt* ded. 1836. hb. Kunth no. 3202) is an annual, much like *E. caribaea*, but having whitened, acute spikelets with thin, loose scales, the achenes becoming purplish-brown to black only when mature. *E. macra*, also from Humboldt, with perhaps a perennial rootstock, is apparently the same, except that it is slenderer and few-

¹ Described from *Gay* no. 282

flowered. Perhaps the West Indian plants listed under *E. Sintenisii* belong here.

45. *E. BAHAMENSIS* Boeckl.; Svenson, RHODORA xxxi. 229 (1929).

46. *E. ATROPURPUREA* (Retz.) Kunth; Svenson, RHODORA xxxi. 227 (1929).

47. *E. CAPILLACEA* Kunth [MAP 19]; Svenson, RHODORA xxxi. 234 (1929).

48. *E. SELLOWIANA* Kunth [MAP 21], Enum. ii. 149 (1837); C. B. Clarke, Ill. Cyp. t. xxxv. figs. 12–16 (1909); Barros, Anales Mus. Hist. Nat. Buenos Aires 437, fig. 4 (1928); Svenson, RHODORA xxxi. 234, t. 191, fig. 42 (1929); Osten, Anales Mus. Hist. Nat. Montevideo, ser. 2a. iii. 168, fig. 16 (1932). *H. albivaginata* δ *macrostachya* Boeckl. Linnaea xxxvi. 438 (1869–70). *E. crispovaginata* Boeckl. in Engler, Bot. Jahrb. viii. 206 (1887), e descr. *E. thermalis* Rydberg, Mem. N. Y. Bot. Gard. i. 69 (1900). *E. galapagensis* Svenson, RHODORA xxxi. 233 (1929). *E. flaccida* sensu Standley, Field Mus. Publ. Bot. viii⁴. 261 (1931), in large part.—URUGUAY: Montevideo, Herter no. 42 (G). PARAGUAY: Villa Encarnacion, Osten no. 7882 (B, S); Igatimi, Hassler no. 5563 (G). BRAZIL: Goyaz, Glaziou no. 22330 (NY); Minas Geraes, Claussen (M. B. no. 1025) (NY); Riedel no. 929 (Cal). FRENCH GUIANA: Cayenne, Broadway no. 940 (G, NY). BRITISH GUIANA: Georgetown, Hitchcock no. 17026 (NY). BOLIVIA: Apolo, alt. 4800 ft., R. S. Williams no. 909 (NY). ECUADOR: Chatham I., Stewart no. 1079; Albemarle I., Stewart no. 1078 (Cal); Indefatigable Island, J. T. Howell no. 9257 (B, Cal). COLOMBIA: Cauca Valley, Pittier no. 635a (NY); Popayan, alt. 1300–2000 m., Lehmann no. 8428 (US). COSTA RICA: vic. Signatapegue, Dept. Comayagua, Standley no. 56052 (US); La Estrella, Prov. Cartago, Standley no. 39362 (US); San Pedro des Monts, Prov. San José, Standley no. 32795 (US); vic. San Sebastian, Prov. San José, Standley no. 32740 (US); La Palma, alt. 1500–1700 m., Maxon & Harvey no. 7920 (NY).

A wide-spread species with coarse, usually rigid and often reflexed culms, varying from dwarfed material (Standley no. 56052 and the type of Boeckeler's *E. albivaginata* δ *macrostachya*) sometimes only 2 cm. high, to the elongated specimens (5 dm.) of *Broadway* no. 940. The TYPE at Berlin (Brazil: Sellow) has culms 10–12 cm. tall, 1.5 mm. wide; and yellowish-olive, turgid achenes 1.3 mm. long. In general, collections from Central America have been labeled *E. ocreata* or *E. Pittieri*. The latter species was described by Boeckeler as having purplish-black achenes, and is therefore to be associated with *E. flavescens*, or more probably, with *E. caribaea*.

E. Arechavaletae Boeckl. Cyp. Nov. i. 14 (1888); Osten, Anales Mus. Hist. Nat. Montevideo, ser. 2, iii. t. xxxiii, figs. 7, 8 (1932). *E. flaccida*

var. *Arechavaletae* (Boeckl.) Osten. (l.c.), p. 167.—This plant, from the vicinity of Montevideo, is nearest to *E. Sellowiana*, with which it has also been associated by Osten. He describes it (p. 168), “20–25 cm. alta, culmis strictis erectis, 1 mm. diam. Spiculis 6–3 mm., squamis pallidis, ad latere ferrugineis. Nux obovata fusca nitida, setae albidæ nuce breviores.” It is probably a distinct species, but I have seen very little material for comparison.

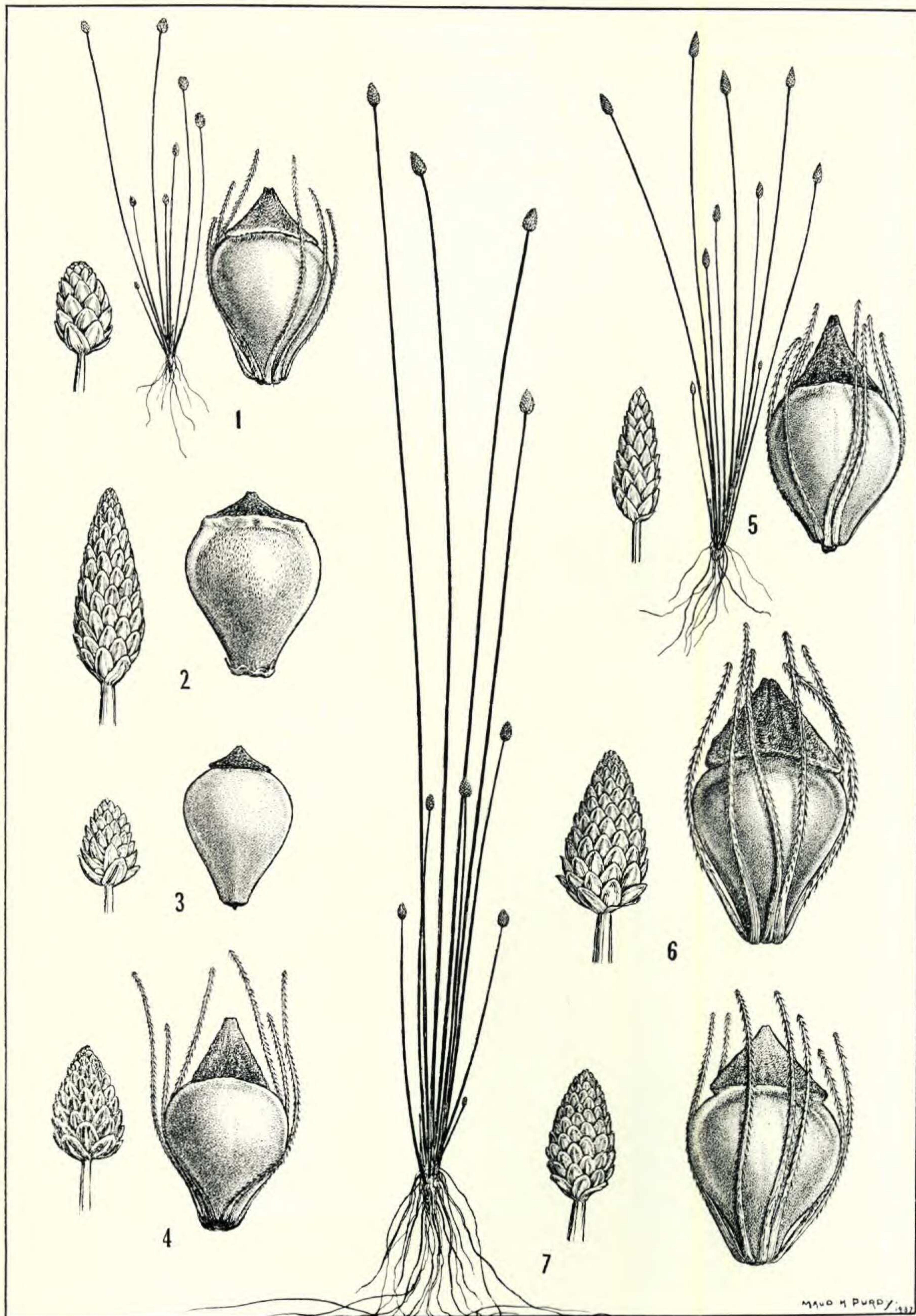
The plants from hot springs in Yellowstone Park (*E. thermalis* Rydberg) have coarse culms and large olivaceous achenes, especially in *A. Nelson* no. 6157 (NY). These, together with *Tidestrom* no. 384, Wasatch Mts., August 28, 1907 (hb. Catholic Univ.), I am placing, though with some hesitation, under *E. Sellowiana*, the species which they most closely approach.

49. *E. SCHAFFNERI* Boeckl. [MAP 23]; Svenson, RHODORA xxxi. 233 (1929).—Added citations: MEXICO: Jicaltepec, *Liebmann* (NY) (as *E. capitata*). HONDURAS: Copan, *Bernoulli* no. 811 (NY). GUATEMALA: between Sacapulas and Aguacatan, 6000 ft. alt., *Amy Spingarn* in 1934 (B). COSTA RICA: *Pittier* no. 548 (US) (as *E. Pittieri*).

This little species is characterized by many-flowered spikelets with small divaricate scales, and striate achenes considerably smaller than those of *E. Sellowiana*.

50. *E. OLIVACEA* Torr. [PL. 541, FIG. 2; MAP 18]; Svenson, RHODORA xxxi. 231 (1929). *E. flaccida* (Reichenb.) Urban, var. *olivacea* (Torr.) Fernald & Griscom, RHODORA xxxvii. 155 (1935).—Additional stations of note: NEW YORK: Knickerbocker Lake, Columbia Co., *McVaugh* no. 3827 (Alb, B); brackish pond, Rensselaer Co., *Wibbe* in 1873 (NY); Dyking Pond, Rensselaer Co., *House* no. 20565 (Alb); Minerva, Essex Co., *House* no. 15458 (Alb); Newcomb, Essex Co., *House* no. 10730 (Alb); Sanford Lake, Essex Co., *House* no. 18068 (Alb); West Fort Ann and Patten's Mills, Washington Co., *Burnhham* (Alb). PENNSYLVANIA: Bristol, Bucks Co., *Driesbach* in 1924 (Carnegie). SOUTH CAROLINA: Aiken, *Ravenel* in 1866 (NY). GEORGIA: Stone Mt., *McVaugh* in 1936 (Ga.). ONTARIO: Toronto, W. Scott (Can.). MICHIGAN: Wycamp Lake, Emmett Co., *Gleason* no. 294 (B, NY); Mud Lake, Cheboygan Co., *Gates* no. 9906 (B); Austin Lake, Kalamazoo Co., *C. R. Hanes* no. 1367 (B). WISCONSIN: Long Lake, Iola, Waupaca Co., *Hotchkiss & Martin* no. 4439 (B). ILLINOIS: Wolf Lake, Chicago, *E. J. Hill* no. 218 (Ill). INDIANA: many collections by *Deam* in the northern part of the state; by *E. J. Hill* and others (Ill) from Lake County. MINNESOTA: Mink Lake, Clearwater Co., *J. B. Moyle* no. 931 (NY).

Throughout the West Indies, typical *E. flavescens* is characterized



ELEOCHARIS, series OVATAE (habit $\times \frac{1}{2}$, spikelets $\times 2\frac{1}{2}$, achenes $\times 20$). FIG. 1, *E. obtusa* var. *jejuna*. FIG. 2, *E. engelmanni* f. *detonsa*. FIG. 3, *E. diandra*. FIG. 4, *E. ovata*. FIG. 5, *E. lanceolata*. FIG. 6, *E. obtusa* var. *gigantea*. FIG. 7, *E. obtusa*.



ELEOCHARIS (habit $\times \frac{1}{2}$, spikelets $\times 2\frac{1}{2}$, achenes $\times 20$). FIG. 1, *E. FLAVESCENS*. FIG. 2, *E. OLIVACEA*. FIG. 3, *E. SINTENISHII*. FIGS. 4, 5, *E. MINUTA*. FIG. 6, *E. SINTENISHII* (*E. SHAFERI*). FIG. 7, *E. INTRICATA* (*E. MADAGASCARIENSIS*). FIG. 8, *E. MINUTA* (*E. MAIDENII*).

by small achenes (0.8–1.0 mm. long) which become reddish-brown before maturity and deep purplish-black when mature. *E. olivacea* has larger achenes, usually with a larger subulate style-base, and an olivaceous surface which sometimes becomes darkened, but does not show the reddish coloration of *E. flavescens*. Color of scales is of little significance, but tends to be faded in estuarine specimens. The bristle character, as in practically all other species of *Eleocharis*, is nearly worthless. Based on these characters, especially the color and size of achenes, I have yet to find undoubted *E. flavescens* north of South Carolina except for two collections: Virginia Beach, Virginia, *Hollick & Britton* in 1890 (NY) and Ogletown, Newcastle Co., Delaware, *Commons* in 1866. Although color of achenes holds well as a specific character in other members of this group, it is possible that a demonstrable transition will be found between *E. flavescens* and *E. olivacea*.

51. *E. FLAVESCENS* (Poir.) Urban [PL. 541, FIG. 1; MAP 22], Symb. Ant. iv. 116 (1903); Britton, Surv. Porto Rico & Virgin Ids. v. 91 (1923). *Scirpus flavescens* Poir. in Lam. Encycl. vi. 756 (1804). *Baeothryon flavescens* A. Dietrich, Sp. Pl. ii. 91 (1833). *Scirpus Gaudichaudianus* Kunth, Enum. ii. 157 (1837). *Eleogenus ocreatus* Nees vars. α 1. *minor*, α 2. *flaccidus* Nees in Mart. Fl. Bras. ii¹. 102 (1842). *Scirpus bahiensis* Steud. Syn. Cyp. 83 (1855). *H. albivaginata* vars. β *flaccida*, γ *stricta*, ϵ *humilis* Boeckl., Linnaea xxxvi. 437, 438 (1869–70). *H. Urbani* Boeckl. Allegm. Bot. Zeit. ii. 20 (1896). *H. Dussiana* Boeckl., op. cit., p. 54; *E. flaccida* (Reich.) Urban, Symb. Ant. ii. 165 (1900); Svenson, RHODORA xxxi. 235 (1929).—West Indies, eastern South America, Mexico and eastern United States. [See also discussion under *E. olivacea*].

The TYPE of *E. flavescens* (Paris) from Porto Rico is 4–6 cm. high, with yellowed culms unusually firm and rigid, and with immature olivaceous achenes. *Scirpus bahiensis* Steud. (TYPE, Paris) from Salzmann's collection at Bahia in 1834 is apparently the same; likewise *Gardner* no. 150 (NY, US), the collection upon which *Eleogenus ocreatus* α 1. *minor* was based. *E. Dussiana* from Martinique, *Duss* no. 466a (COTYPE, NY), is an elongate form. *S. Gaudichaudianus* from Rio Janeiro (TYPE, Berlin) outwardly resembles *E. radicans*, with culms 10–15 cm. long, and small, olivaceous achenes. It has been determined as *H. albivaginata* var. *stricta* by Boeckeler. *H. Urbani* (PL. 545, FIG. 4), founded on worthless material of *Glaziou* no. 17174 (TYPE, Cop) from Rio de Janeiro, is apparently *E. flavescens*. The specimen of *E. laetevirens* Steud. Cyp. 79 (1855) at Berlin, probably a

COTYPE, has ocreate sheaths as in *E. flavescens* but many-flowered spikelets resembling those of *E. atropurpurea*, under which it was included by Boeckeler. The achenes are unusually small (0.7 mm. long) with a translucent brownish-olive surface, and the swollen culms are 6–12 cm. long and nearly 1 mm. wide. It may well represent a distinct species allied to *E. Schaffneri*. Weigelt's specimen of *Scirpus flaccidus* at Berlin (TYPE) with small olivaceous achenes and the habit of "*Scirpus planifolius* Muhl.," is perhaps the same *E. laetevirens*. *E. flavescens* is not definitely known from Central America, and the only Mexican collection seen, is from Guadalajara, *Pringle* no. 3431 (NY).

E. FLAVESCENS (Poir.) Urban var. **fuscescens** (Kuekenenthal), n. comb. *E. flaccida* var. *fuscescens* K. in Fedde, Rep. Spec. Nov. xxiii. 191 (1926); Svenson, RHODORA xxxi. 238 (1929). *E. praticola* Britton in Small, Fl. Se. U. S. 182 and 1327 (1903); Svenson, RHODORA xxxi. 229 (1929).

Re-examination of the type of *E. praticola* shows that it is composed of two things:

- 1) plants 3–4 cm. high, with weak culms and brown spikelets, sheaths marcescent at apex, achenes reddish-brown (0.75 x 0.5 mm.) with white bristles half as long. *E. flavescens* var. *fuscescens*.
- 2) plants 3–4 cm. high, with rigid flattened culms, brown spikelets, red sheaths with pointed apex; achenes black (0.85 mm. long) with brown rudimentary bristles. *E. caribaea*.

The achenes of *E. praticola* were described as "about 0.5 mm. long, dark brown" with bristles "retroscely barbed, shorter than the achene," and this description applies only to the specimens with scarious sheaths. My description of *E. praticola* (l.c.) was based on mixed material, but the illustration (pl. 191) shows the "*flavescens*" type, both in habit and achene. *Fredholm* no. 5820 was selected as the TYPE by Dr. Britton, and an envelope on a separate sheet has in *Fredholm's* writing "Plant comes near *E. capitata* R.Br., but the bristles are shorter (about 2/3) than achene which is dark brown, not jet black Plant only found in shallow excavations on Kissimmee prairie." These dwarf Florida specimens are not the equivalent of Kuekenenthal's Cuban plants with culms 6–10 cm. tall, which represent ordinary *E. flavescens* with brownish scales, but I do not know where to draw the line.—CUBA: Santa Clara, *Ekman* no 18369^b. FLORIDA: *Fredholm* no. 5820 (in part) (TYPE of *E. praticola*, NY); *A. A. Eaton*, Dade County in 1903 (NY) and no. 837 (in part) (G);

Eva, Polk County, *Small & DeWinkeler* no. 9760 (NY). Specimens of *E. praticola* previously cited from Cuba and the Bahama Islands are here referred to *E. geniculata* (*E. caribaea*).

52. *E. SINTENISII* Boeckl. (PL. 541, FIG. 3). MAP 24. *Rootstocks wide-creeping to matted-lignescant; culms filiform, 0.5–3 dm. long, often short and rigid, irregularly sulcate; sheaths stramineous to purple, the apex acute, not inflated: spikelets usually few-flowered, elliptic-lanceolate to ovate, obtuse to acute; scales obtuse to subacute, stramineous to purple, often with a green midrib: stamens 2 or 3, anthers 0.4–0.7 mm. long: style 2-fid: achenes lenticular, narrowly obovoid, 0.9–1.4 mm. long, shining black; style-base conical to subulate; bristles light brown to white, equalling or exceeding the achene.*—Cyp. Nov. i. 16 (1888). *E. Shaferi* Britton, Mem. Torr. Bot. Club xvi. 59 (1920) [PL. 541, FIG. 6]. *E. yunquensis* Britton, Bot. Porto Rico & Virgin Ids. v. 92 (1923). *E. atropurpurea* sensu Britton (op. cit., p. 91); not (Retz.) Kunth. *E. Ekmanii* Kuekenenthal in Fedde, Rep. Spec. Nov. xxiii. 192 (1926); Svenson, RHODORA xxxi. 230 (1929). *E. debilis* Kunth, forma *macra* (Kunth) Boeckl., sensu Kuekenenthal (l. c.) (as to Cuban plants).—Porto Rico, Cuba, and the Florida Keys. PORTO RICO: prope Bayamon ad Palo Seco in fossis, hb. Krug. & Urban no. 1220 (NY, COTYPE of *E. Sintenisii*); moist places between Bayamon and Comerio, *Britton* no. 8527; Sierra de Naguabo, *Shafer* nos. 3607 (NY), 3138 (NY); Collazo River, *Britton* no. 8671 (NY); wet savanna near Laguria, San José, *Britton & Britton* no. 7179 (NY); Luquillo Mts., 950 m., *Britton & Bruner* no. 7619 (NY, TYPE of *E. yunquensis*). CUBA: Campo Florido, Havana, *Ekman* no. 19015 (NY, COTYPE of *E. Ekmanii*); Batabano, Havana, *Shafer* no. 231 (NY); Santa Clara City, *Ekman* no. 18846 (NY); Sierra Nipe, near Woodfred, Oriente, *Shafer* no. 3414 (NY, 2 sheets), (TYPE of *E. Shaferi*); Sierra de Nipe, Oriente, *Ekman* no. 2146 (NY); limestone plain, Ensenada de Siguanea, *Britton & Wilson* no. 14892 (NY). FLORIDA: hammocks, Big Pine Key, *Small & Small* no. 5081 (NY); lime sink, Big Pine Key, *Killip* no. 32079 (US, B).

Of the rhizomatous West Indian specimens with acute sheath-apex, I can make out only a single species, although a considerable amount of variation occurs in size of achenes. Those of the type of *E. Shaferi* are 1.4 mm. long, including the subulate style-base. Smaller specimens, such as the type of *E. Sintenisii*, have achenes often only 1.0 x 0.5 mm. The relatively narrow achene of material from mountainous parts of Porto Rico and Cuba broadens out in the collections from Big Pine Key to average 0.9 x 0.6 mm., but I see no distinction between the Florida plants and, for example, *Britton* no. 7179 from Porto Rico. *E. Sintenisii* is closely related to *E. maculosa* and *E. geniculata* (*E. caribaea*), and also to *E. debilis* of Brazil.

53. *E. GENICULATA* (L.) R. & S.

Through examination of specimens described in *Hortus Cliffortianus*, which are at the British Museum, J. E. Dandy adequately shows that the description of *Scirpus geniculatus* L. rests entirely upon the plant which Linnaeus actually saw, which is the species now called *E. caribaea*. The large species with septate culms, passing as *Eleocharis geniculata*, must take the name *E. elegans* (HBK) R. & S.

Some time ago Mr. Dandy sent me a letter, embodying the results of his investigation of the status of *E. capitata*. A synopsis of this report has been published by C. X. Furtado in the Gardens Bulletin, Straits Settlements ix. 293, 294, 298-299 (1937). I must therefore be content with excerpts from Mr. Dandy's letter:

"*Scirpus capitatus* belongs to *Eleocharis*, and under this genus Blake (1918) took up for it the name *E. capitata* R. Br., which he treated as a new combination having *S. capitatus* L. as basis. But here he erred, for *E. capitata* R. Br. was not founded on *S. capitatus* L.; Robert Brown plainly indicated as much by deliberately excluding the Clayton plant which is the holotype of *S. capitatus*. What Brown did cite under *E. capitata* was "*Scirpus capitatus*. Linn. sp. pl. ed. Willd. 1. p. 294. (secundum synonyma Brownii et Sloani . . .)" together with *Scirpus culmo nudo, spica terminatrice subrotunda* L. (Hort. Cliff.) . . . "In view of these facts, *E. capitata* R. Br. must be regarded as the name of a new species and not as a new combination, and the lectotype should be the plant from which Brown drew up his description, namely his own no. 5930 from Australia (in the British Museum Herbarium). This plant is conspecific with *E. caribaea*, and so also is the "*Hortus Cliffortianus*" plant which Brown referred to *E. capitata* and which will be further discussed below.

"Thus *Scirpus capitatus* L. and *Eleocharis capitata* R. Br. are independent species based on different types and it follows that Brown's name prevents the valid transfer of Linnaeus's epithet *capitata* to *Eleocharis*. The next earliest name for Linnaeus's species is *S. filiformis* Lam. (1791), but this is invalidated by *S. filiformis* Burm. f. (1768). The next available name is *S. tenuis* Willd. (1809), and as this is legitimate the correct name for the species under *Eleocharis* is *E. tenuis* (Willd.) Schult.

"*Scirpus geniculatus* L. was based on *Scirpus culmo nudo, spica terminatrice subrotunda* L. (Hort. Cliff.) together with *Juncus aquaticus geniculatus, capitulis equiseti, major* Sloane and *Juncus aquaticus geniculatus, capitulis equiseti, minor* Sloane. In the Linnean Herbarium there is no specimen named *S. geniculatus* by Linnaeus; there is only a specimen (from Browne) which was named *S. geniculatus* by Solander and which was not in the herbarium in 1753. This specimen has been determined by C. B. Clarke as *Eleocharis interstincta*. It has certainly no status as regards the typification of *S. geniculatus*. Apparently the only actual specimen of *S. geniculatus* which Linnaeus saw and accepted was the plant in the Hortus Siccus Cliffortianus (now at the British Museum) which he originally named *S. culmo nudo, spica terminatrice subrotunda*. His original description of *S. geniculatus*, "*Scirpus culmo tereti nudo, spica subglobosa terminali*," was virtually a rewording of his phrase-

name published in the "Hortus Cliffortianus," and the plant dealt with in that work should be taken as the lectotype of *S. geniculatus*. The Sloane synonyms were included solely on the evidence of Sloane's descriptions and figures; Linnaeus had not seen the actual plants, which are now preserved in the Sloane Herbarium at the British Museum.

"The "Hortus Cliffortianus" plant, which is thus the lectotype of *Scirpus geniculatus* L., has already been mentioned above in the discussion of *S. capitatus*. It is identical with *Eleocharis caribaea* and was correctly referred by Robert Brown to his *E. capitata*. This means that the names *E. caribaea* (Rottb.) Blake and *E. capitata* R. Br. become synonyms of *E. geniculata* (L.) Roem. Schult., which was based on *S. geniculatus* L., though Roemer and Schultes followed Vahl in treating the true (lectotypical) plant as var. β ."

The synonymy of the true (emended) *E. geniculata* is as follows¹:

ELEOCHARIS GENICULATA (L.) Roem. & Schult. Syst. Veg. ii. 150 (1817) emend., quoad var. β . *Juncus aquaticus geniculatus, capitulis equiseti, minor* Sloane, Cat. Pl. Ins. Jam. 37 (1696); Voy. Jam. Nat. Hist. i. 122, t. 75 fig. 2 (1707). Ray, Hist. Pl. iii. 628 (1704). *Scirpus culmo nudo, spica terminatrice subrotunda* L. Hort. Cliff. 21 (1737). Royen, Fl. Leyd. Prodr. 48 (1740). *Scirpus geniculatus* L. Sp. Pl. i. 48 (1753) pro parte, excl. syn. *Juncus* . . . *major*. *Scirpus caribaeus* Rottb. Descr. Pl. Rar. Ic. Ill. 24 (1772). *Scirpus geniculatus* var. *minor* Vahl, Enum. Pl. ii. 251 (1806). *Eleocharis capitata* R. Br. Prodr. 225 (1810). *Eleocharis geniculata* var. *minor* (Vahl) Roem. & Schult. loc. cit. (1817). *Eleogenus capitatus* (L.) Nees ex Wight, Cat. 113, n. 1899 (1834) pro parte, excl. syn. L. *Limnochloa geniculata* (L.) Nees in Mart. Fl. Brasil. ii, 1. 99 in adnot. (1842) pro parte. *Chlorocharis capitata* (R. Br.) Rikli in Pringsh. Jahrb. Wiss. Bot. xxvii. 564 (1895). *Eleocharis caribaea* (Rottb.) Blake in RHODORA xx. 24 (1918).²

Revised nomenclature of the three species (and additional synonymy of *E. geniculata*) is as follows:

(1) *E. GENICULATA* (L.) R. & S.; not of recent auths. *E. setacea* R. Br. Prodr. 225 (1810). ? *Scirpus caducus* Delile, Fl. Egypte 9, t. 6, fig. 2 (1813). *E. caduca* Schultes, Mant. ii. 88 (1824); Kunth, Enum. ii. 151 (1837); Steudel, Syn. Cyp. 79 (1855); Boiss. Fl. Orient. v. 388 (1884); C. B. Clarke, Journ. Bot. xxv. 268 (1887); Durand & Schinz, Consp. Fl. Afr. v. 597 (1895); Terraciano, Malpighia ii. 305 (1888); Fiori, Fl. Ital. Ill. fig. 421 (1921). *Scirpus Brownii* Spreng. Syst. i. 204 (1825). *E. riparia* Nees ex Spreng. Syst. iv.² 27 (1827), as synonym of *S. Brownii*. *Scirpus palmaris* Willd. ex Kunth, Enum. ii. 150 (1837), as synonym (Willd. no. 1185!). *E. microformis* Buckley; Svenson, RHODORA xxxi. 230 (1929).

(2) *E. ELEGANS* (HBK) R. & S. Syst. ii. 150 (1817). *E. geniculata*

¹ Sec. J. E. Dandy.

² Svenson, RHODORA xxxi, 225 (1929).

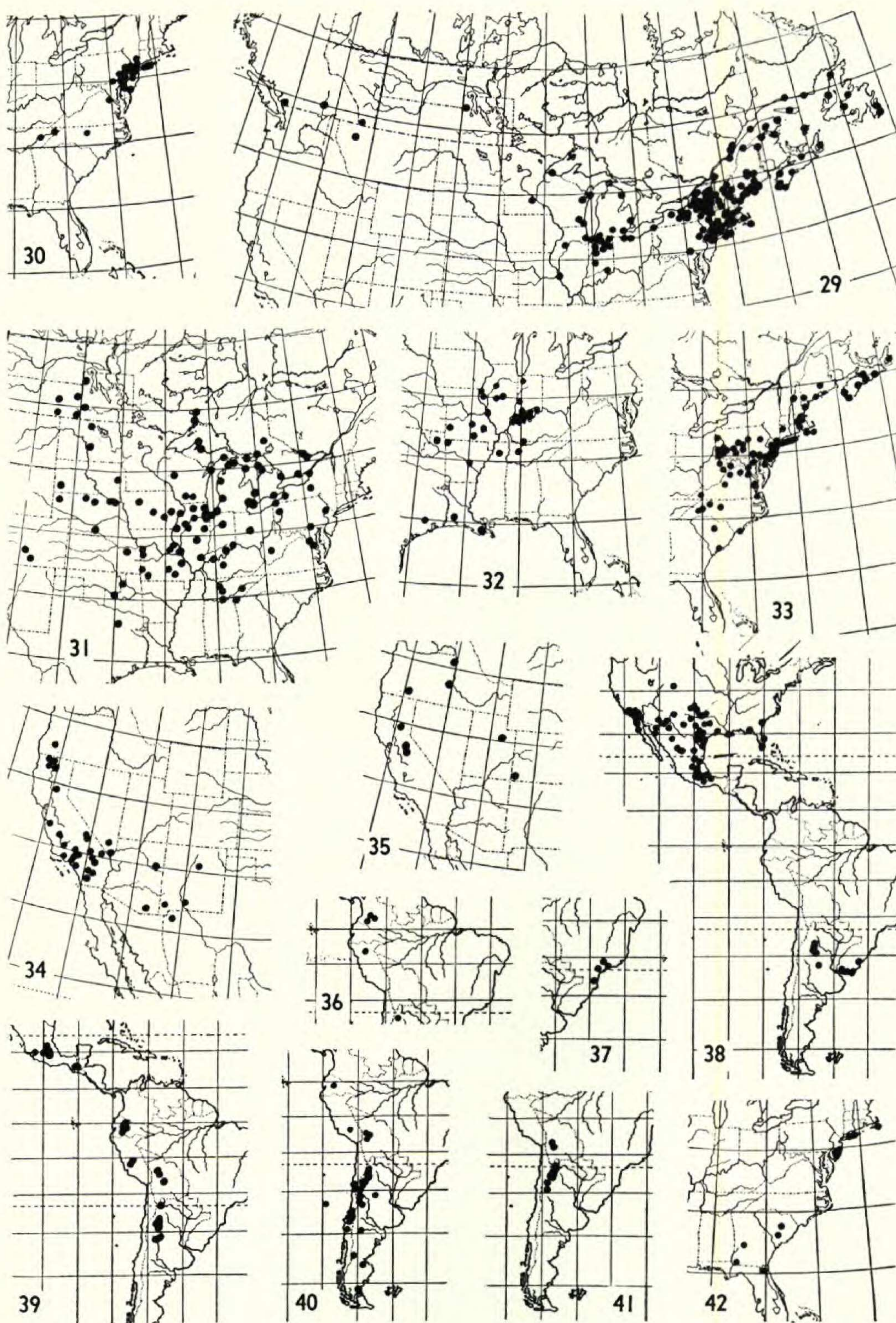
of auths.; Svenson, RHODORA xxxix. 259 (1937); not *Scirpus geniculatus* L.

The type collection of *Scirpus elegans* at Berlin (Kunth hb. 3226) bears the notation "Lima, D'Urville ded. 1835. *Scirpus geniculatus* Linn. (fide herb. Vahl). *Scirpus elegans* Humb. & Kth. ex herb. Willd. descripsit."

(3) *E. TENUIS* (Willd.) Schultes, Mant. ii. 89 (1824); *E. capitata* (L.) R. Br. var. *typica* Svenson, RHODORA xxxiv. 199 (1932).

Stations for *E. geniculata* (*E. caribaea*; *E. dispar*) about the Great Lakes have been much extended through the explorations of Dr. T. M. C. Taylor and Dr. F. J. Hermann (cf. RHODORA xxxvii. 365-367 (1935)). This is the most widely-distributed species of *Eleocharis* in the world, and it would be strange if it did not appear in the interior of North America. The plant of the Great Lakes is the lax form seen at the limit of range, apparently identical with *E. setacea* of Australia. Plants with similar roseate to purple scales and purple achenes are common in the tropics (cf. *Moldenke* no. 511 (NY) and *Small & Carter* no. 2887 (NY)), nor does laxness of habit or even reduction of bristles have much significance. No advantage appears to be gained by maintaining var. *dispar*. Of E. J. Hill's care in describing *E. dispar* no one can doubt, but his letter to Dr. Britton (accompanying specimens) shows that he compared with his Indiana material "perennial" plants of *E. capitata*, i.e. *E. flavescens*, which comprised the true "*Scirpus capitatus* L." of Torrey's herbarium.

The type of *E. caduca* (Delile) R. & S. [Paris] from Damietta, Egypt, is a plant without stolons, with upper sheaths acute and definitely not ocreate, and with purplish-black achenes 1.2 mm. long. But Delile's plate definitely shows a plant with stolons. From Sardinia I have seen another collection of *E. caduca* (*I. Mueller* in hb. Calif. Acad.). The dwarf round-headed *E. microformis* from Texas with achenes 0.7-0.9 mm. long, often confused with *E. atropurpurea*, I now believe to be a small extreme of *E. geniculata* (*E. caribaea*), similar to specimens from Nicaragua (*Maxon, Harvey & Valentine* no. 7291 (NY)), and from Honduras (*Schipp* no. 913 and *Standley* no. 56671 (NY)). *E. caribaea* var. *Stokesii* F. B. H. Brown, Bishop Mus. Bull. 84: 106, Pl. xivB (1931), was published without being distinguished from typical material, but the variety at any rate cannot have much significance.



MAPS 29-42. Map of *ELEOCHARIS*: 29, *ELLIPTICA*; 30, *TENUIS* var. *PSEUDOPTERA*; 31, *COMPRESSA*; 32, *TENUIS* var. *VERRUCOSA*; 33, (*TENUIS* var. *TYPICA*); 34, *PARISHII*; 35, *BOLANDERI*; 36, (*NODULOSA* var. *ANGULATA*); 37, *SUBARTICULATA*; 38, *MONTEVIDENSIS*; 39, *DOMBEYANA*; 40, *ALBIBRACTEATA*; 41, *CRINALIS*; 42, *TRICOSTATA*.

OCREATAE (Old World)

The Old World material has at times been placed under *E. flaccida* var. *humilis*, which is equivalent to *E. flavescens*; but it actually represents two well-defined species of variable habit, differing markedly from *E. flavescens* in the character of the achenes:

Mature achenes olivaceous, 1.0 mm. long. *E. minuta*.
Mature achenes purplish-black, 1.2–1.3 mm. long. *E. intricata*.

54. *E. MINUTA* Boeckl. (PL. 541, FIGS. 4, 5, 8) MAP 26. Culms spongy, 1–3.5 cm. long, green, decumbent or arching, closely matted, sulcate-flattened to quadrangular; sheaths membranous, but not conspicuously inflated; spikelets ovoid, 3–7-flowered; scales ovate, subacute, 1–1.5 mm. long, scarcely keeled, green, often with purple sides; stamens 3; achenes biconvex, olivaceous, obovate, 1 mm. long, 0.6 mm. wide, lightly striolate-reticulate; style-base flattened-apiculate, $\frac{1}{4}$ as wide as the achene; bristles 6–7, white, equalling the achene.—Engl. Bot. Jahrb. v. 503 (1884); Chermezon, Bull. Soc. Bot. France lxxv. 285 (1928). *E. Maidenii* Kuekenenthal in Fedde, Rep. Spec. Nov. xiii. 135 (1914).—MADAGASCAR: *Hildebrandt* no. 3527 (Cop); *Perrier de la Bâthie* nos. 2688 (B), 18484 (B); *DeCary* in 1921 (K). UGANDA: King's Lake, Kampala, *Hancock & Chandler* no. 27 (K, B). AUSTRALIA: Brisbane River, *Bailey* (K); Richmond River, *C. Moore* no. 159 (K) (as *E. atropurpurea*); Northgate to Nudgee, Brisbane, on wet mud, *S. T. Blake* no. 4724 (B).

Boeckeler's type or cotype (Cop) of *E. minuta* is less compact than *P. de la Bâthie*'s no. 2688, and the subulate style-base is a trifle more prominent. These are the same as *Bailey*'s dwarf plants from Brisbane, but the species ranges to much larger plants with culms as high as 14 cm. (cf. *Blake* no. 4724).

55. *E. INTRICATA* Kuekenenthal in Fedde, Rep. Spec. Nov. xiii. 135 (1914) [PL. 541, FIG. 7; MAP 27]; *Svenson*, RHODORA xxxi. 239 (1929). *E. radicans* Kunth, Enum. ii. 142 (1837) (as to Mauritius plant only), not *Scirpus radicans* Poir. *Scirpus repens* Willd. ex Schult. Mant. ii. 84 (1824). *E. Chaetaria* sensu Baker, Fl. Maur. & Seychelles 420 (1877); not R. & S. *E. madagascariensis* Chermezon, Bull. Soc. Bot. France lxxv. 284 (1928).—East Africa, Madagascar and Mauritius. AFRICA: Kyimbila, Nyassa, 15–1600 m., *M. Stolz* no. 1132 (COTYPE, Ph, K); Socotra, *Balfour* no. 457 (K). MADAGASCAR: *P. de la Bâthie* no. 16646 (B); *Blackburn* in 1863 (K, as *E. setacea*). MAURITIUS: *Horne* in 1876 (K, as *E. acicularis* and *E. Chaetaria*); in streams, *R. E. Vaughan* B43 (K); banks of Moka River, *P. B. Ayres* in 1861 (K); *M. Bouton* (K, as *Scirpus natans*); *H. H. Johnston* in 1888 (K).

Scirpus repens Willd. (no. 1175), based on dwarf plants collected

by Petit-Thouars in Mauritius, closely resembles *Scirpus radicans* Poir., and has immature olivaceous achenes 1.2 mm. long, the style-base being more prominent than in *E. flavescens*. *E. intricata* and *E. madagascariensis* have identical spikelets and achenes (1.2–1.3 mm. long, with prominent style-base), and differ only in habit; the latter plant having culms up to 16 cm. high and sheaths decidedly ocreate, though not as prominently as in *E. flavescens*.

Series 6: PALUSTRIFORMES, Subseries: PALUSTRES

The North American representatives of this group received an excellent and detailed treatment by Fernald & Brackett in RHODORA xxxi. 57–77 (1929). Yet the group in its wider distribution presents such baffling interrelationships and so few tenable characters that this present treatment must necessarily be provisional. In eastern United States, thanks to the above-mentioned work, the entities are clear; in Europe and in western United States, the situation seems to be chaotic. The *Palustres*, chiefly of holarctic distribution, have probably spread out in post-glacial time, achieving a variation comparable with that of *Rubus* or *Crataegus*. In Western United States, with its natural barriers and diversified terrain, numerous intergrading geographical races have developed, the most noteworthy of which I have illustrated by drawings and photographs. It would be perfectly easy to describe more species in this group, adding to the plethora of intangible species, but I have made little or no change. In my mind, there is even some question whether more than a single good species of the *Palustris* group exists in northwestern Europe, and whether in Europe there are not environmental responses to sea-strand, meadow, and bog, which parallel the variation of *E. palustris* in western America. Although I have spent an inordinate amount of time on this group and have seen a vast amount of material, the problems do not appear to be close to solution. A careful, perhaps statistical, study of the group is needed throughout Europe; then, with enlightenment as to actual lines of specific demarcation, a similar treatment of the plants of western United States should be attempted. For this I hope that I have at least built up a framework.

Comparative width of the tubercle (style-base), the uniglumate character of the spikelet, rigidity or softness of the culm, or even a mucronate sheath-apex, are characters which do not always hold in species of this group. For example, the type and associated collections

of *E. macrostachya*, which have a well-developed mucro, pass imperceptibly into plants with non-mucronate sheaths; normal *E. macrostachya* freely intergrades with uniglumate plants of the Great Plains and westward, and specimens with soft flaccid culms merge directly into those with rigid culms. One collection which Dr. Ada Hayden has sent me (no. 7010 from Clay Co., Iowa) has plants with the lower half flaccid and ribbon-like, the upper half cylindric and rigid; such structural variations probably reflect rapid change in water-level or show differences in submerged and emerged portions of the culm.

Similar intergradations appear in European plants. With hopes of solving the *E. palustris* problem, I collected specimens in Europe during the summer of 1937, whenever it was possible to do so. The largest collection consisted of homogeneous plants (PL. 542, FIG. 1) from sandy lake-shores at Ramkvilla, north of Wexiö in Sweden, growing with *Scirpus lacustris*, *Lobelia Dortmanna*, *Ranunculus reptans* and *Litorella uniflora*. These had the rigid opaque culms of typical *E. palustris*. Yet specimens (32) selected at random all had the wide tubercle (wider than high) characteristic of *E. mamillata*, and, to make matters worse, 4 of them ($12\frac{1}{2}\%$) were definitely uniglumate. Such rigid plants with ovate spikelets and dusky divaricate scales acute and strongly hyaline at the apex, appeared to be representative of *E. palustris* in Småland, the province where Linnaeus lived. Plants with thin, semitranslucent culms (*E. mamillata*), occasional along meadow brooks, had tubercles of the same type. The achenes of *E. palustris*, though variable in size, were larger, duller, and somewhat more reticulate than is usual in plants of eastern North America; in well-developed specimens they averaged 2.6 mm. long and 1.5 mm. wide, with tubercles 0.4 mm. high and 0.43 mm. wide. This type of plant is characteristic of much of the herbarium-material of *E. palustris* from Sweden, and even with the fine lot of specimens given to me by Dr. Samuelsson, I have not reached a satisfactory basis for precise separation of *E. palustris*, *E. mamillata*, and *E. uniglumis*. Though the amplexicaule lower scale is the criterion for determination of *E. uniglumis*, the dark brown semi-glutinous scales and the subsaline habitat are equally characteristic. It was rather disconcerting to find such material [PL. 542, FIG. 2] (all but the uniglumate condition) along the seacoast near Giant's Causeway in Ireland.

In addition to Clarke's revision of the *Eleocharis* species of Europe¹

¹ Journ. Bot. xxv. 267-271 (1887).

and the complicated treatment of the *Palustris* group by Ascherson & Graebner under *Scirpus*,¹ the European *Palustres* have been elaborated by H. Lindberg² and by Beauverd.³ In the last-named treatment, the varying spiral arrangement of the scales is illustrated for several species; *E. benedicta* is described from an alpine lake in Savoy, and Dr. Lindberg's *E. mamillata* is reduced to a subspecies under *E. palustris*.

As to the type of *E. palustris*, I have examined the two sheets in the Linnaean herbarium at London. One of these is *E. multicaulis*, from which the idea that typical *E. palustris* was a small plant may have been derived. The other is *E. mamillata*, so labeled by Dr. Lindberg, of which I have a photograph through the kindness of Mr. Savage. In recent correspondence, Dr. Lindberg is of the opinion that this Linnaean specimen should not be accepted as the sole type of *Scirpus palustris*.

Scirpus glaucescens, represented by no. 1188 in the Willdenow Herbarium, belongs with *E. palustris*. It is most likely that Willdenow made an error in counting or transcribing the number of style-branches, for the material has styles definitely bifid. The plant is characterized by a large number of filiform sterile culms with somewhat inflated sheath-apices. It does not resemble any material that I have seen from North America, but appears to be a glaucous form of the European species, much like specimens which I collected in a tidal stream near Newquay in Cornwall.

Scirpus nudissimus Steud. & Jardin, Bull. Soc. Linn. Normandie, ser. 2, ix. 278, 280 (1875) (a *nomen subnudum*), the TYPE (Paris) coming from Honolulu, has shining dark yellow achenes 1.5 mm. long, with a whitened constricted style-base. It is the same as *E. palustris* β *australis* Nees, Nov. Act. Acad. Caes. Leopold Nat. Cur. xix. Suppl. i. 96 (1843), based on a collection by Meyen from Oahu (COTYPE, Cal. Acad.). Here belongs a specimen from the U. S. Exploring Expedition (G) and also *Degener* no. 9002 (NY, collected May. 10, 1927), from an arid part of the campus of the University of Hawaii at Honolulu, and not seen elsewhere by him. These specimens are all exceedingly close to typical *E. macrostachya*, and like *E. obtusa* var. *gigantea* they have probably been sporadically introduced from the North American continent.

¹ Synopsis der Mitteleuropaischen Flora ii². 289 (1904).

² Die nordeuropaischen Formen von *Scirpus* (*Heleocharis*) *paluster* L., Acta. Soc. Fauna et Flora Fennica xxiii, no. 7: 1-16, 2 pl. (1902).

³ Bull. Soc. Bot. Genève, ser. 2, xiii. 245-265, 4 figs. (1921).

The European *E. mamillata*¹ seems to be well represented in France (Haute Saone, *Bonati* (B)). It probably has earlier names. To me *E. macrostachya* and *E. mamillata* do not appear to be identical, *E. macrostachya* having much firmer scales and a mucronate or sub-mucronate sheath-apex, as well as the following differences in achenes:

E. MAMILLATA	E. MACROSTACHYA
Achenes average 2.1 mm. x 1.1 mm., rather compressed, dull yellow, conspicuously cellular. Tubercle broad and scarcely constricted. Bristle-teeth coarse.	Achenes average 1.8 mm. x 1.0 mm., glistening yellow, smooth, with "lemon rind" texture. Tubercle narrow, with constricted neck. Bristle-teeth slender.

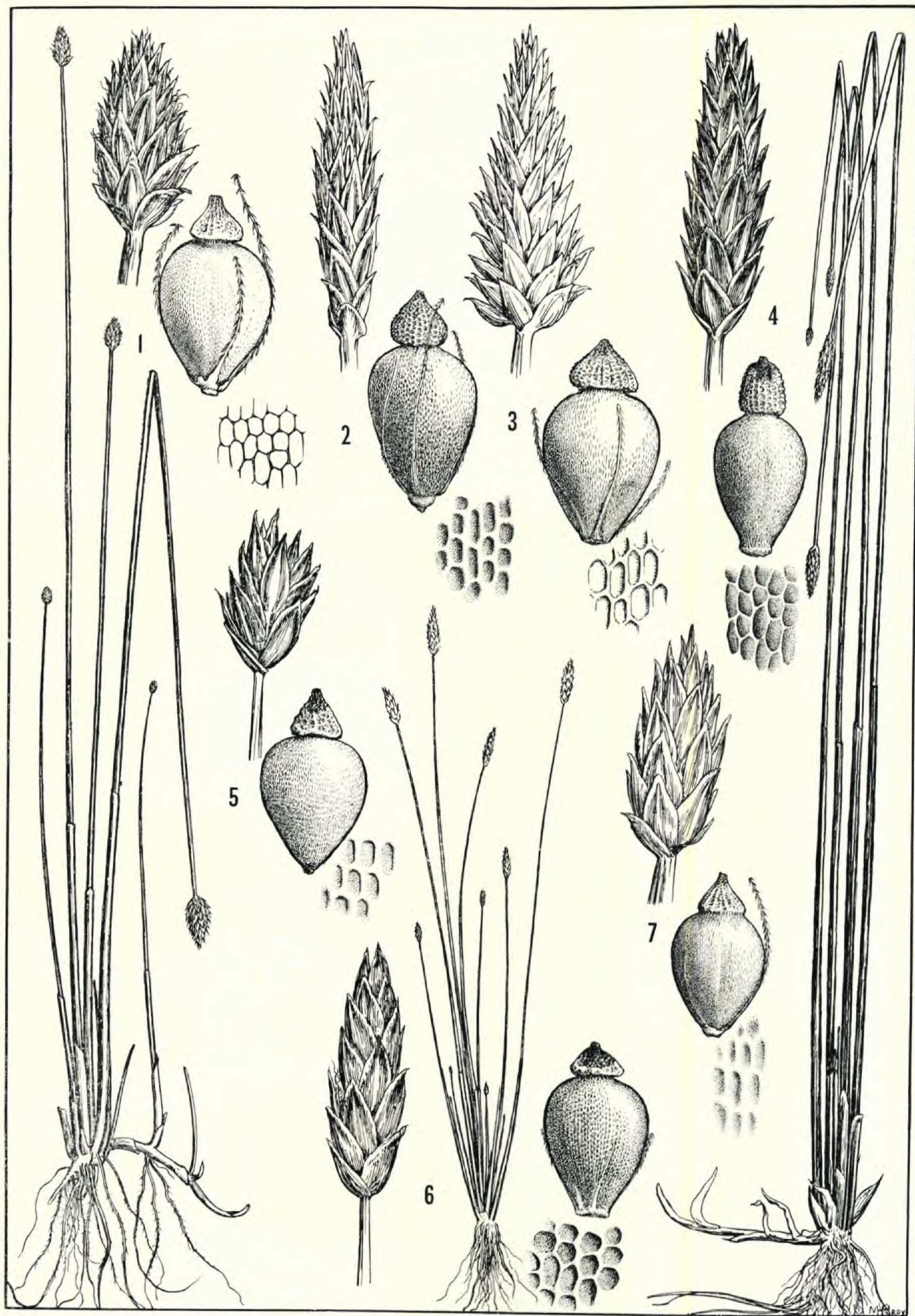
E. macrostachya was fortunately based on excellent specimens around which the western material can be aligned. I have seen a wealth of herbarium material which falls naturally into about a dozen recognizable but intergrading races showing varied shape, color and rigidity of spikelets [cf. PL. 547]. The hardened, twisted culms of the Mexican *E. xyridiformis*—which I believe to be one of these races—can be traced northward into Arizona and to the Uinta Basin of Utah. Northeastward it passes directly into typical *E. macrostachya* of the Oklahoma region, and into a spiralling plant with less-hardened culms characteristic of western Missouri and Kansas, then merges into a soft-culmed phase in Missouri which outwardly resembles *E. mamillata* of Europe. In Mexico, *E. xyridiformis* fades out into softer plants of homogeneous texture but with variously colored spikelets, one type merging at the Texas border into a marked race with long-acuminate pale spikelets. The abundant specimens from the Great Plains of Wyoming represent a combination of these characters, to be expected in the geographical center of the species. This transition passes northwestwardly into short-headed plants of eastern Oregon and eastern Washington with hard purple-margined scales; to the southwest into a similar form with acuminate scales characteristic of the Uinta Basin; southeast to typical *E. macrostachya*; northward in the mountains of Montana to a soft-culmed phase reaching its climax in the region of Glacier Lake and with difficulty, if at all, separable from *E. palustris*. In middle and southern California the culms tend to be

¹ The three species involved are:

56. *E. PALUSTRIS* (L.) R. & S. [PL. 542, FIGS. 1, 2; PL. 547, FIGS. 9, 10, 14, 15, 19, 21; MAP 64]; Fernald & Brackett, RHODORA xxxi. 59 (1929).

57. *E. MAMILLATA* Lindb. f. [PL. 542, FIGS. 3, 7; PL. 547, FIGS. 4, 8]; Fernald & Brackett, RHODORA xxxi. 66 (1929).

58. *E. MACROSTACHYA* Britton in Small, Fl. Se. U. S. 184, 1327 (1903) [PL. 547, FIGS. 3, 7, 11, 13, 17, 18, 20; MAP 67]. *E. xyridiformis* Fernald & Brackett, RHODORA xxxi. 76 (1929) [PL. 547, FIGS. 12, 16].



ELEOCHARIS, subseries PALUSTRES (habit $\times \frac{1}{2}$, spikelets $\times 2\frac{1}{2}$, achenes $\times 10$). FIGS. 1, 2, *E. PALUSTRIS*. FIGS. 3, 7, *E. MAMILLATA*. FIGS. 4-6, *E. UNIGLUMIS*.



ELEOCHARIS (habit $\times 1\frac{1}{2}$, spikelets $\times 2\frac{1}{2}$, achenes $\times 10$). FIG. 1, *E. SAVATIERI*. FIG. 2, *E. DREGEANA*. FIG. 3, *E. LIMOSA*. FIG. 4, *E. DEBILIS*. FIG. 5, *E. MARGINULATA*.

tall and flattened (as in *E. mamillata*) with many-flowered, often elongated, somewhat distichous spikelets, the extreme phase constituting *E. perlonga* Fernald & Brackett.

Along the seacoast from British Columbia to California, *E. macrostachya* passes into large black-spiked plants, frequently uniglumate, and often identified as *E. uniglumis*. The large-headed, occasionally uniglumate, plants from the Canadian Great Plains, represented by *Macoun* nos. 5 (G), 50 (NY), and 300 (G), offer a similar problem; likewise they are involved with *E. palustris*. In many respects the *Macoun* collections are similar to the remarkable plants collected by Dr. Fassett (no. 16739) from a lake-shore at Drummond, Wisconsin; and to Ehler's no. 2763 (Catholic Univ.) from Mackinac County, Michigan, a specimen, however, with the characteristically terete culms of *E. palustris*.

It may be mentioned here, to show the unstable grounds for species determination in this group, that western material of *E. palustris* [cf. MAP 64] has been determined by me almost solely on the character of rigid inflated culms; *E. calva* wholly as slender plants with uniglumate spikelets. *E. palustris* in eastern North America is ordinarily characterized by hardened, terete culms, and ovate spikelets with soft hyaline-tipped scales. But plants with soft flattened culms are occasional, for example *Wiegand & Hotchkiss* no. 27521 and *Fernald & Wiegand* no. 27520 from Newfoundland. Some specimens (especially *Fernald & Wiegand* no. 4698, *Wiegand & Hotchkiss* no. 27521, and *Fernald & Wiegand* no. 27520) have unusually narrow tubercles, but similar plants (cf. *Fernald & Long* in *Pl. Exsic. Gray.* no. 437) from Nova Scotia, have tubercles broader than high.

The *Palustris* group appears to be equally complex in Asia, and I can merely cite the following additional species from eastern Europe and Siberia, included by Zinserling,¹ *Flora U. S. S. R.* iii. 75–90 (1935), with illustrations, and with Latin descriptions in the addenda:

BIGLUMES:

H. ussuriensis, *H. leptostylopodiata*, and *H. intersita* (p. 581); *H. crassa* Fisch. & Mey., *H. globularis* (p. 582); *H. kasakstanica*, *H. ecarinata*, *H. turcomanica* (p. 583); *H. argyrolepidoides* (p. 584); *H. equisetiformis* (Meinsh.) B. Fedtsch. (p. 72, 80).

¹ For the opportunity of seeing cotypes of many of these species I am greatly indebted to Dr. V. Lubimenko, Director of the Herbarium at Leningrad.

UNIGLUMES:

H. eu-uniglumis (p. 584); *H. transcaucasica*, *H. Klingei* (Meinsh.) B. Fedtsch. (p. 585); *H. multiseta*, *H. septentrionalis*, *H. oxylepis* (Meinsh.) B. Fedtsch., *H. scythica* (P. 586); *H. fennica* Palla (p. 587) (including var. *sareptana*); *H. paucidentata*, *H. Komarovii*, *H. Korshinskyana* (p. 588).

In South America, the *Palustris* group is represented in Argentina, as might be expected, by *E. macrostachya*, illustrated (as *E. palustris*) by Barros, Anales Mus. Hist. Nat. Buenos Aires xxxiv. 443, fig. 8 (1928). One collection, *O. Kuntze* no. 32 (NY), closely duplicates the *perlonga* phase of Texas. The following specimens are cited: ARGENTINA: Prov. Santiago del Estero, *Venturi* no. 5631 (B, G, US); General Roca, Rio Negro, *W. Fischer* no. 160 (G, NY); Alrededores de La Plata, *Cabrera* nos. 1697 (G), 1795 (G). URUGUAY: Barra Santa Lucia, *Osten* no. 22713 (B, G). In Patagonia, the Falkland Islands and Chile, the dark-spiked *E. melanostachys* apparently represents the Antarctic element, perhaps identical with *E. neo-zeylandica*, and with achenes somewhat similar to those of *E. Dregeana*.

59. *E. NEO-ZEYLANDICA* C. B. Clarke ex T. Kirk, Trans. N. Z. Inst. xxvi. 260 (1894); Cheeseman, Man. N. Z. Fl. 768 (1906); Clarke, Ill. Cyp. t. xxxvi. fig. 10-14 (1909).

E. neo-zeylandica, represented at Kew by Kirk's nos. 1005 and 1248 from Cape Farewell, has inflated sheaths, shiny golden-brown, lightly reticulate achenes 2 mm. long, with unusually small tubercles.

60. *E. MELANOSTACHYS* (d'Urville) C. B. Clarke. Culms usually inflated, 0.5-6 dm. high, 1-3 mm. wide in dried material, the surface often roughened by minute internal prominences: sheaths inflated, often acute to submucronate at the apex: spikelets usually acute, 0.5-2.0 cm. long: scales loosely appressed, purplish-brown to castaneous with prominently hyaline tips, often with greenish midrib, the lowermost frequently striate-pallid: stamens 3, anthers 2.5 mm. long: style 2-fid: achene obovate, 2.0-2.5 mm. long, lemon yellow, becoming dark lucid brown when mature, lightly reticulate: style-base small, $\frac{1}{4}$ as wide as achene, conic, often as broad as high: bristles equalling the achene, frequently rudimentary or lacking.—Engler, Bot. Jahrb. xxx, Beibl. 68: 20 (1901); Macloskie, Fl. Patagonia viii (suppl.). 67 (1914) (as *H. megalostachys*); Barros (l. c.) 441, fig. 7 (1928). *Scirpus melanostachys* d'Urville, Mém. Soc. Linn. Paris iv. 600 (1826). *Fimbristylis melanostachys* Brongn. in Duperry, Voy. Coquille Bot. 181 (1829); Steudel, Syn. Cyp. 107 (1855). *Isolepis heteromorpha* Steud. Syn. Cyp. 100 (1855). *H. macrorrhiza* Boeckl. Flora xli. 413 (1858). *H. valdiviana* R. A. Philippi, Linnaea xxix. 77 (1857-58). *H. litoralis* Philippi (l. c.). ? *H. melanocarpa* Philippi and *H. appendiculata*

Philippi (op. cit.) 85 (1857–58). *Scirpus heteromorphus* F. Phil. Cat. Pl. Chil. 311 (1881). *E. simulans*¹ Clarke (l. c.) and Ill. Cyp. t. xxxvi, figs. 19–24 (1909). *H. funebris* Speg. Anales Mus. Hist. Nat. Buenos Aires vii. 177 (1902).—Specimens examined: FALKLAND IDS.: *J. D. Hooker* (K); *d'Urville* (Paris) (TYPE of *Scirpus melanostachys*: culms 3–6 cm. high; scales dark brown to black). ARGENTINA: Posadas, Terr. Santa Cruz, *Donat* no. 261 (G, NY). CHILE: Santiago, *Philippi* no. 1879 (Paris) (as *E. appendiculata*: culms scarcely 1 mm. wide; spikelets acute); Santiago, *Philippi* no. 704 (Stockholm) (as *E. appendiculata*: culms slender; sheath-apex cartilaginous, but not apiculate); Corral, *Philippi* no. 642 (Stockholm) (as *E. litoralis*: culms only 4–8 cm. high; scales dark brown); *Philippi* (Berlin) (*E. valdiviana*, similar to *E. heteromorpha*); Valdivia, *Gunckel* no. 2743 (G); Valparaíso, *Jaffuel* nos. 778 (G), 794 (G); Valle de Marga-Marga, Prov. Aconagua, Coast Ranges (lat. 33° 10' S.) *Jaffuel & Pirion* nos. 1433 (G), 3133 (G); Santiago, *Montero* no. 558 (G) and *G. T. Hastings* no. 362 (NY); Prov. Cautin, *Montero* nos. 1993 (G), 2448 (G); Concepcion, *Jaffuel* no. 2956 (G). PERU: vic. Cuzco, alt. 3600 m., *A. S. Hitchcock* no. 22555 (NY) (perhaps *E. macrostachya*).

61. *E. DREGEANA* Steud. (PL. 543, FIG. 2). Rhizome coarse and elongate; culm soft, striate, sometimes with minute cellular prominences, 1–3 dm. high, 1–3 mm. wide; sheaths castaneous, loose, the apex somewhat inflated and quickly marcescent-lacerate: spikelets lanceolate, 1–1.5 cm. long, acute, *many-flowered*: the scales obtuse to subacute, castaneous, often with darker margins: stamens 3; anthers 1.3 mm. long: style 2-fid: achene ovate, convex, 1.7 x 1.0 mm., light brown, smooth: style-base yellow, *mucroniform*, $\frac{1}{4}$ – $\frac{1}{3}$ the length of the achene-body: bristles shining brown, with short teeth.—Syn. Cyp. 78 (1855). *E. palustris* sensu C. B. Clarke in Thistleton-Dyer, Fl. Capensis vii. 198 (1898). *Limnochloa capensis* Nees, Linnaea x. 185 (1836) (acc. to Clarke, l. c.). *E. capensis* Nees ex Boeckl. Linnaea xxxvi. 467 (1869–70) (in synonymy).—SOUTH AFRICA: Ongeluk, Griqualand, Jan. 1, 1813, *Burchell* no. 2649 (G, K); Brintjes Hoogte, Somerset Div., *Burchell* no. 3046 (K); Stylkloof, near Richmond, 4000–5000 ft., *Drège* in 1840 (K); sine loc., *Lehmann* (NY) (as *E. limosa*); *Drège* (Paris) (TYPE of *E. Dregeana*).

The achenes of this plant are of approximately the same size and texture as those of *E. calva* of eastern United States.

62. *E. MITRACARPA* Steud. Culms usually coarse and spongy, striate, thin and flattened when dry, 1–4 mm. wide: *sheaths loose, purple or reddish-brown at base, the apex truncate, subinflated* and often marcescent: spikelets oblong-lanceolate, subacute, many-flowered: scales castaneous, with subacute hyaline apex, often with green mid-

¹ Cf. RHODORA xxxvi. 385 (1934). Pfeiffer, Herbarium no. 56. p. 54, has taken up the name *H. andina*, based on *Scirpus andinus* Phil. Anal. Univ. Chil. 1873, 554 (1873), in place of *E. simulans*.

rib and darker sides, the lowest not amplexicaule: stamens 3, anthers 2.0–3.0 mm. long: style 2-fid: achene obovate, biconvex, 1.5–2.0 mm. long, dull yellow, smooth: style-base gray, *mitriform*, $\frac{1}{4}$ as long as *achene-body*, usually thickened at base and cellular-hispidulous under magnification; bristles lightly tinged with brown, equaling the achene.—Syn. Cyp. 77 (1855). *E. palustris* var. ϵ . *humilis* Nees in Wight, Contrib. Bot. Ind. 113 (1834).—Persia to Japan, Kamtchatka. PERSIA: prope ruinas, Persepolis, *Kotschy* no. 390 (TYPE, Paris). AFGHANISTAN: hb. *Griffith* nos. 6236 (NY), 6237 (NY) & 6238 (NY); Kurrum Valley, *Aitchison* in 1879 (partim, G). INDIA: Ind. bor. occ. *Thomson* (G, NY, Paris); Punjab, *Thomson* (G) (as *E. compacta*); Sersa, Punjab, 800 ft., *Koelz* nos. 1598 (NY), 1599 (NY); Sind, *Pinwill* (NY); Rawalpindi, n. w. India, *Stewart* no. 7060 (NY); Gurdaspur near Beas River, Punjab, *Stewart* no. 1326 (NY); Shalimar, Kashmir, 5000 ft., *Stewart* no. 3232 (NY); Katrain, Punjab, 5000 ft., *Koelz* nos. 1907 (NY), 1644 (NY); Dharmasala, Punjab, 4000 ft., *Stewart* no. 1864 (NY); Lahul, Himalaya, *Koelz* no. 605 (NY); Sikkim, 9–10,000 ft., *Hooker* (G). CHINA: Yunnan, *Ducloux* no. 250; Mengtse, Yunnan, *A. Henry* no. 10862 (NY); Tsingtao, Shantung, *Chiao* no. 2483 (NY); Kweichow, 400 m., *Tsiang* no. 4867 (NY); Peiping, *Liou* no. 6997 (NY); Ning-wu-Hsien, N. Shansi, 5400 ft., *Tang* no. 1296 (NY); Gehol, Mongolia orientale, *David* in 1864 (Paris). JAPAN: Hokkaido, *Tanaka* no. 167 (NY). RUSSIA: Savoiko, Kamtchatka australis, *Hultén* in 1928 (NY); Mt. Palorinaja, Kamtchatka, *Everdam* (G). The following JAPANESE specimens (issued as *E. pileata*) are apparently the same, except for lack of red color in sheaths: Sapporo, hb. *Agric. College* (sine coll.) in 1878 (G); Sapporo, *Arimoto* in 1903 (G); Musashi, *Sakuraj* no. 47 (G).

In India, plants of the *Palustris*-group appear singularly homogeneous, characterized by inflated sheaths, striate culms, firm yellow achenes and a broad, almost orbicular, grayish tubercle. The filament-bases or receptacular part of the achene are as a rule prominently dark-purple. The species ranges from dwarf rigid-culmed plants (cf. *A. Henry* no. 10862 from Yunnan, and some of *Thomson's* collections from the Punjab) to tall plants with soft wide culms (cf. *Koelz* no. 1599 from the Punjab). Spikelets vary in color from nearly white (cf. hb. *Griffith* no. 6238 from Afghanistan, which is an exact match for *Meffert-Abramowitz* no. 572 from Turcoman, issued as *E. argyrolepis*) to dark chocolate-brown (as in *Koelz* no. 1644). The species extends eastward through China and Japan without obvious alteration.

63. *E. SAVATIERI* C. B. Clarke (PL. 543, FIG. 1). Culms slender, erect, 4–6 dm. long, 0.5–1.0 mm. broad, glistening grayish-green, compressed when dry, obscurely striate: sheaths 6–8 cm. long, bright chestnut to reddish brown, with brown-margined acute apex: spike-

lets elliptic, subacute, 8–12 mm. long, loosely 15–25-flowered: scales soft, obtuse to acute, not keeled, reddish-castaneous striolate, the lowest amplexicaul: stamens 3: style 3-fid: achene elliptic, the castaneous body 1 mm. long, lenticular, broadly obovate, lightly reticulate; style-base elongate-mitriform, 2 mm. long, as wide as the achene-body, strongly inflated-cellular; bristles none.—Kew Bull. Add. Ser. viii. 21 (1908) and Ill. Cyp. t. xxxvi. figs. 15–18 (1909). *Scirpus mitratus* Franch. & Savat. Enum. Pl. Jap. ii. 111, 544 (1879).—JAPAN: in uliginosis, Yokoska, *Savatier* (Paris, TYPE coll.); Yesan, *Fauri* no. 7536 (Paris) (spikelets darker and with firmer scales).

This species, as Franchet & Savatier point out (p. 111), is well differentiated from *Scirpus pileatus* A. Gray, by the presence of a tubercle *twice* as long as the achene-body (as in Clarke's illustration), and by the complete absence of bristles. The illustration is from the type collection of *Scirpus mitratus*, which I have borrowed among other specimens from Paris, through the kindness of Professor Gagnepain.

PALUSTRES (eastern North America)

64. *E. CALVA* Torr. [PL. 547, FIGS. 1, 5; MAP 65]; Fernald & Brackett, RHODORA xxxi. 68 (1929). *E. erythropoda* Steud. Syn. Cyp. 76 (1855).

E. calva seems to be characteristic of the marl and limestone areas of New York and New Jersey, being almost unknown from eastern New England, and represented by only a single collection from Long Island: Woodside, *Ferguson* no. 4997 (NY). Culms and spikelets are usually slender and elongated; the achenes are small and of fairly constant size, averaging 1.7 x 1.0 mm. in typical specimens. In eastern United States this plant appears to be perfectly distinct and offers no difficulty in identification.

E. Baeothryon Schultes, Mant. ii. 92 (1824) was based on *Scirpus* no. 6, Muhl. Gram. 29 (1817), [incorrectly cited as no. 7 by Torrey], and *E. Muhlenbergiana* Schultes, op. cit., p. 74, was similarly described from Muhlenberg's *Scirpus* no. 4. These numbers I could find neither in Muhlenberg's herbarium at Philadelphia, nor in Willdenow's at Berlin; therefore, since they were inadequately described, both names should be rejected. *Scirpus* no. 7 in hb. Willd. is a very young plant of *E. calva*; in hb. Muhlenberg it is *E. tuberculosa*.

65. *E. SMALLII* Britton [PL. 547, FIGS. 2, 6; MAP 66]; Fernald & Brackett, l. c., p. 64.

The TYPE of *E. Smallii* (from Harrisburg, Pennsylvania) has rigid swollen culms. This phase, which perhaps reaches its extreme in

Deam's no. 49387 from Bear Lake, Noble County, Indiana (culms 5 mm. wide in dried specimen, *not* flattened) has acuminate spikelets with appressed scales. The type collection of *E. Smallii* is probably pathogenic to some extent, since relatively few of the scales bear mature achenes, and in these the tubercles are swollen and not normal. *Eleocharis* is susceptible to smuts and other fungous diseases resulting especially in slight distortions of the style-base (tubercle), often not obvious to the general botanist. More than one species, in my estimation, has been described on the basis of such pathogenic distortions. In the *Palustres* special care must be observed when it is obvious that fifty percent or more of the achenes fail to mature; even in healthy material the tubercles may be extremely variable (cf. PL. 547, FIGS. 18, 21). *E. Smallii* is fairly easily recognized by its rigid texture, obvious in the stiff acuminate scales and the hardened character of the sheaths, which are usually black at the apex, with a prominently darkened V-shaped sinus. The achenes average 2.0 x 1.1 mm. It is the prominent and only common species of the *Palustres* in fresh-water ponds of southern New England.

66. *E. AMBIGENS* Fernald, RHODORA xxxvii. 394, t. 387, figs. 1-8 (1935).

The description of *E. ambigens* by Professor Fernald clears up also the puzzling citations of *E. compressa* (*E. acuminata*) from Louisiana.¹

Additional citations: MARYLAND: sea beaches, eastern shore, *Canby* (NY). VIRGINIA: river swamps, Munden, *Mackenzie* no. 1828 (NY); damp location in mixed woods, n. e. of Williamsburg, *E. J. Grimes* no. 3708 (NY). FLORIDA: *Chapman* (NY). Florida or Georgia, *Croom* in 1836 (NY). LOUISIANA: New Orleans, *R. S. Cocks* no. 1555 (G); *J. Hale* (G, NY) (as *E. acuminata*); Opelousas, *Wm. Carpenter* (NY); Morgan City, *Svihla* in 1926 (NY).

E. nervosa Kuekenenthal,² perhaps the same as *E. ambigens*, is far too immature for identification. Two collections of the *Palustres* are also known from PORTO RICO:

66a. *E. FALLAX* Weatherby, RHODORA xxiv. 23 (1922); Svenson, RHODORA xxxiv. 225 (1932).

67. *E. HALOPHILA* (Fernald & Brackett) Fernald & Brackett, RHODORA xxxvii. 395, t. 387, figs. 12-14 (1935). *E. uniglumis* var. *halophila* Fernald & Brackett, RHODORA xxxi. 72, t. 183, figs. 17-26 (1929).—Along the seacoast from the Gulf of St. Lawrence to Virginia.

¹ Britton, Journ. N. Y. Microsc. Soc. v. 109 (1889), the *Hale* specimen being given an unpublished name by Dr. Britton.

² Fedde, Rep. Spec. Nov. xxiii. 192 (1926) based on *Ekman* no. 18543 from CUBA: Laguna la Grande, in swamps that surround the limestone hills at Chinchila (TYPE S; COTYPE NY).

68. *E. UNIGLUMIS* (Link) Schultes [PL. 542, FIGS. 4–6]; Fernald & Brackett, *RHODORA* xxxi. 71, t. 183, fig. 31 (1929); Fernald, *RHODORA* xxxvii. 395, t. 387, figs. 9–11 (1935).—*E. uniglumis* reaches its southern limit in eastern America on the mountains of Newfoundland.

69. *E. KAMTSCHATICA* (C. A. Meyer) Komorov; Fernald & Brackett, *RHODORA* xxxi. 75 (1929).

To this species Fernald & Brackett have questionably added (as a synonym) *Scirpus sachalinensis* Meinsh. Acta Hort. Petrop. xviii. 260 (1901). For this Komarov (Acta Hort. Petrop. xxxix. 34 (1923)) has taken up the name *E. Glehni* (*Scirpus Glehni* Meinsh.), published without further reference and apparently a “nomen nudum.”

Subseries: TRUNCATAE (North American Species)

Since the name *E. geniculata* is to be applied to the tropical species with lenticular black achenes and *E. capitata*, as a name, is unavailable (see discussion under the *Maculosae*), *E. tenuis* returns as the familiar name for the plant of northeastern United States. After examining the immature type of *Scirpus tenuis* (Willdenow no. 1184), I find it best to maintain it as the equivalent of Clayton's specimen, though there is perhaps a tendency toward the var. *pseudoptera*. *Scirpus ellipticus* Willd. no. 1172, sent by Muhlenberg to Willdenow, consists of three immature culms of what I have called *E. capitata* var. *borealis*,¹ and a nondescript culm of an allied plant. At Berlin, the name *Scirpus ellipticus* was in general early use for this northern plant, which, in its shallow achene-pitting and other characters, is probably closer to *E. compressa* than to *E. tenuis*. In view of this taxonomic difficulty, and to avoid a new combination, I am recognizing *E. elliptica*.

70. *E. ELLIPTICA* Kunth, Enum. ii. 146 (1837) [MAP 29]; Steudel, Syn. Cyp. 76 (1855). *Scirpus ellipticus* Willd. ex Kunth, Enum. ii. 146 (1837) (as synonym). *E. capitata* var. *borealis* Svenson, *RHODORA* xxxiv. 200 (1932).

71. *E. TENUIS* (Willd.) Schultes [MAP 33]. *E. capitata* var. *typica* Svenson, *RHODORA* xxxiv. 199, t. 219, figs. 56, 57; t. 221, figs. 1, 13 (1932).—Additional citations: WEST VIRGINIA: Morgantown, *Mills-paugh* no. 219 (NY); Pickens, Randolph Co., *H. H. Smith* no. 1354 (Wisc). NORTH CAROLINA: many collections in hb. Duke Univ. SOUTH CAROLINA: Hartsville, *J. B. Norton* in 1921 (NY); Charleston, *Beyrich* (Cal. Acad.).

E. TENUIS var. ***pseudoptera*** (Weatherby) n. comb. [MAP 30]. *E. capitata* var. *pseudoptera* Weatherby in Svenson, *RHODORA* xxxiv. 202, t. 221, figs. 3, 16 (1932).

¹ *RHODORA* xxxiv. 200, t. 219, figs. 58, 59; t. 221, figs. 4, 15 (1932).

This variety, of wider range than I had previously suspected, is abundant on western Long Island and on Staten Island. In western New Jersey it is found in meadows with *Castilleja* and *Thalictrum revolutum* and extends southward along the mountains to Tennessee (Fountain City, *J. K. Underwood* in 1920 (B)).

E. TENUIS var. **verrucosa** (Svenson), n. comb. [MAP 32]. *E. capitata* var. *verrucosa* Svenson in RHODORA, xxxiv. 202 (1932).—Extends southward to LOUISIANA: Lake Charles, *Plank* in 1892 (NY); Acadia Parish, *R. M. Harper* no. 3469 (B) and TEXAS: Houston, *E. Hall* in 1872 (NY); and occurs in Virginia (cf. Fernald in RHODORA, xl. 391 (1938)).

72. *E. COMPRESSA* Sull. [MAP 31]; Svenson, RHODORA xxxiv. 215, t. 219, figs. 62, 63; t. 221, figs. 5, 6, 18 (1932).—Noteworthy additions: NEW JERSEY: Dingmans, *K. K. Mackenzie* in 1920 (NY). WEST VIRGINIA: Fayette Co., *L. W. Nuttall* (Duke). ALABAMA: Monte Sano, Huntsville, *R. M. Harper* no. 3405a (B). TEXAS: Dallas, *Reverchon* no. 3595 (NY). NORTH DAKOTA: Custer, *Rydberg* no. 1074 (NY). COLORADO: Mt. Lincoln, *Coulter* in 1873 (NY); Salida, *M. A. Carleton* no. 553 (NY); La Veta, *Rydberg & Vreeland* no. 6473 (NY).

73. *E. NITIDA* Fernald; Svenson, RHODORA xxxiv. 203, t. 219, figs. 54, 55 (1932).

74. *E. ACUTISQUAMATA* Buckley; Svenson, RHODORA xxxiv. 218, t. 219, figs. 60, 61; t. 220, fig. 7 (1932).

75. *E. TRICOSTATA* Torr. [MAP 42]; Svenson, RHODORA xxxiv. 219, t. 220, figs. 77, 78 (1932).—SOUTH CAROLINA: boggy places, Santee Canal, *Ravenel* (NY); cane savanna, Sumter Co., *W. Stone* no. 383 (NY).

75a. *E. CYLINDRICA* Buckley; Svenson, RHODORA xxxix. 265, t. 464, fig. 5 (1937).

76. *E. BOLANDERI* A. Gray [MAP 35]; Svenson, RHODORA xxxiv. 224, t. 220, figs. 68, 69 (1932).—UTAH: Moon Lake, Uinta Basin, 8100 ft., *Graham* no. 9318 (Carnegie Mus.). COLORADO: Dolores [Montezuma Co.], 7000 ft. *C. S. Crandall* in 1892 (NY).

77. *E. PALMERI* Svenson, RHODORA xxxiv. 223, figs. 73, 74; (1932).

78. *E. DECUMBENS* Clarke; Svenson, RHODORA xxxiv. 224, t. 219, figs. 52, 53 (1932).

79. *E. PARISHII* Britton [MAP 34]; Svenson, RHODORA xxxiv. 221, t. 220, figs. 66, 67; t. 221, fig. 12 (1932).—Additional citations: NEW MEXICO: Las Vegas, *Plank* in 1895 (NY); Mesilla Valley, *Standley* no. 410 (NY). ARIZONA: Colley's Ranch, *Gooding* no. 1113 (NY). OREGON: Riddle, Douglas County, *Peck* no. 7030 (NY). CALIFORNIA: Mission Creek, Riverside County, *J. T. Howell* no. 2878 (Cal); Panamint Mts., Inyo Co., alt. 3500 ft., *J. T. Howell* no. 4055 (Cal); alkaline flats, Lancaster, Los Angeles County, *J. T. Howell* no. 4894 (Cal); Mission Pine, San Rafael Mts., alt. 6000 ft., *Hoffmann* in 1930

(Cal); Santa Isabel, San Diego Co., *Wolf* no. 2245 (Cal); Clear Creek, Butte County, *H. E. Brown* no. 137 (NY); San Benito County, *R. S. Ferris* no. 6870 (NY); Trinity Center, Trinity County, *J. T. Howell* no. 12692 (NY); Siskiyou County, *L. C. Wheeler* nos. 3230 (B), 2915 (B), 2626 (B).

E. Parishii, which seems to be a derivative of *E. Dombeyana*, is not confined to desert areas, as I previously intimated, but occurs up to 6000 ft. in mountain meadows.

80. *E. INTERMEDIA* (Muhl.) Schultes. *E. reclinata* Kunth; Svenson, *RHODORA* xxxix. 262 (1937).—TENNESSEE: sandy bed of stream, Cedar Creek, Morris Lake Basin, Campbell Co., *J. K. Underwood* (B).

As Professor Fernald has kindly pointed out to me, the previous homonyms of *Scirpus intermedius* do not invalidate the use of the name *intermedia* under *Eleocharis*, provided a legitimate name under *Eleocharis* was not available before Schultes' transfer (1824). Thus in the International Rules of Botanical Nomenclature (1935), Article 69, "Where a new epithet is required, an author may, if he wishes, adopt an epithet previously given to the group in an illegitimate combination, if there is no obstacle to its employment in the new position or sense." "The combination *Talinum polyandrum* Hook. (in Bot. Mag. t. 4833: 1855) is illegitimate, being a later homonym of *T. polyandrum* Ruiz et Pav. (Syst. Fl. Per. 1, 115: 1798): when Bentham transferred *T. polyandrum* Hook. to *Calandrinia*, he called it *Calandrinia polyandra* Fl. Austral. 1, 172: 1863). This is treated, not as a new combination, but as a new name, *C. polyandra* Benth. (1863)."

81. *E. MACOUNII* Fernald; Svenson, *RHODORA* xxxix. 265 (1937).

Subseries: TRUNCATAE

KEY TO SOUTH AMERICAN SPECIES

- a. Spikelets linear-lanceolate; scales black; style-base mucroniform. 82. *E. Dombeyana*.
- a. Spikelets obtuse; achenes prominently reticulate with conic to depressed-pyramidal style-base. b.
- b. Style-base with lobes decurrent on angles of achene
Rhizome coarse, subterranean; achenes greenish-yellow
(Andes) 83. *E. crinalis*.
- Rhizome slender, achenes golden-brown. 84. *E. Rabenii*.
- b. Style-base not decurrent
- c. Dwarf, 3-6-flowered Andean species with black scales;
style-base pyramidal. 85. *E. albibracteata*.
- c. Many-flowered lowland species with brown scales; style-
base conical. 86. *E. montervidensis*.

82. *E. DOMBEYANA* Kunth, Enum. ii. 145 (1837) [MAP 39]. *E. montana* sensu Svenson, *RHODORA* xxxiv. 222 (1932), not (HBK) R.

& S. *Chaetocyperus stoloniferus* Nees, *Linnaea* xix. 695 (1847). *E. truncata* Schlecht. *Bot. Zeitung* vii. 118 (1849); Steud. *Syn. Cyp.* 77 (1855). *E. bivaginata* Steud. *Syn. Cyp.* 77 (1855). *Limnochloa truncata* Liebm. *Vidensk. Selskr. Skr.* V, ii. 244 (1851). *E. stolonifera* Boeckl. *Linnaea* xxxvi. 424 (1869-70).

E. Dombeyana may prove to be a plant as local and as misunderstood as *E. montana*, but I am including here, possibly incorrectly, all the material with smooth achenes (under high magnification) and mucroniform style-base. The TYPE (Berlin, *Kunth* no. 3210), based on Dombey's collection from Peru (ex. Mus. Paris) I have not seen exactly duplicated, nor is the locality of collection known. Dombey's plant has slender rhizomes and elongate culms (3 dm. high and nearly 1 mm. wide), bearing acute spikelets (8 mm. long) with dark brown to nearly black scales. The achenes are 1.3 mm. long, golden-yellow to brown, smooth under magnification, trigonous with blunt outer angle, and have a crown-shaped trigonous style-base. This specimen is exceptionally large and the achenes have a peculiar low style-base, but in Dombey's similar specimen at Paris, the style-base tends to be elongated. Should further collections in Peru show *E. Dombeyana* to be distinct, the name to be taken up for the common Mexican-Andean plant would be *E. stolonifera*. The TYPE (*Aschenborn*, hb. *Nees* no. 1737) (Berlin) consists of plants only 6 cm. high, which bear the indefinite locality "Mexico." For *E. truncata*, also from Mexico, two citations are given by Schlectendal: Mineral del Monte (*Ehrenberg*) and *Berlandier* no. 365 (sine loc.). I have not seen these collections, but from description, I believe *E. truncata* is the same as *E. stolonifera*.

Additional citations of *E. Dombeyana*: MEXICO: Morales, San Louis Potosi, *Schaffner* nos. 212 (NY), 577 (NY); *Liebmann* (as *Limnochloa truncata*) (NY); Morelia, Michoacan, 2000 m., *Arsène* no. 2720 (NY). GUATEMALA: Santa Elena, Chimaltenango, 2400-2700 m., *Skutch* no. 419 (NY); San Miguel Uspantan, Quiché, 6000 ft., *Heyde & Lux* no. 3554 (NY). ECUADOR: Ambato, Prov. Tungurahua, *Pachano* no. 110 (NY). ARGENTINA: Sierra Grande, 2200 m., Cordoba, *Burkart* no. 7144 (G); Sierra de San Luis, *Kurtz* no. 8516 (NY); Tilcara, Jujuy, *Venturi* no. 7269 (US, B); Dept. Capital, Tucuman, *Venturi* no. 2276 (US, B); Chigligasta, Tucuman, *Venturi* no. 4753 (G). Without loc.: hb. *d'Urville* (Paris, TYPE of *E. bivaginata*).

My previous Peruvian citations from the Wilkes Expedition should read "Obrajillo" and "Casa Cancha," respectively. Both localities are in the mountains northeast of Callao.

83. *E. CRINALIS* (Griseb.) Clarke (PL. 544, FIG. 2). MAP 41. Culms filiform, in dense fascicles on remote ascending branches of a thickened wide-spreading subterranean rootstock, 4- or 5-angled, sulcate, 4–20 (rarely to 45 cm. as in type) high: sheaths reddish at base, the tumid ferruginous apex truncate and obscurely apiculate: spikelets ovate to elliptic (8–40-flowered), 3–6 mm. long: scales appressed, firm, scarcely keeled, mostly obtuse, castaneous to ferruginous with a lighter midrib: stamens 3, anthers 1.0 mm. long: style 3-fid: achene (0.8–1.0 mm. long, 0.6 mm. wide) greenish-yellow, striolate-reticulate; style-base brown, acuminate-pyramidal, with prominent basal margin and concave sides; bristles light brown, slender, equalling the achene.—Kew Bull. Add. Ser. viii. 23 (1908); Barros, *Anales Mus. Hist. Nat. Buenos Aires* xxxiv. 470, 490, fig. 23 (1928). *Scirpus crinalis* Griseb. Pl. Lorentz. 217 (1874) and Symb. Fl. Argent. 311 (1879). *E. Brehmeriana* Boeckl. Allg. Bot. Zeit. ii. 33 (1896); Svenson, *RHODORA* xxxi. 180, pl. 189, fig. 24 (1929). *E. boliviana* Palla ex Svenson, *RHODORA* l. c. (p. 179).—BOLIVIA: Mandon no. 1416 (G, in part) (K, NY) (CO-TYPE of *E. Brehmeriana*); La Paz, Buchtien nos. 3143 (G, NY), 4482 (TYPE of *E. boliviana*). ARGENTINA: Quebrada del Tala, Catamarca, Lorentz & Hieronymus nos. 401 and 448 (Berlin, TYPE); Tilcara, Jujuy, Venturi no. 6192 (B, US) (as *E. Chaetaria*); San Pedro, Jujuy, Venturi no. 9679 (NY, US); Tafi, Tucuman, Venturi nos. 4371 (B, US), 7271 (B, G, US); Famaila, Tucuman, Venturi no. 6191 (B, US) (as *E. Chaetaria*); Sierra del Cajon, Tucuman, Venturi no. 4371 (G); Campo Quijano, Salta, Venturi no. 9445 (B, G, US) (as *E. Chaetaria*), and Guachipas, Salta, Venturi no. 9839 (G).

Except for a non-cancellate surface, the achenes of *E. crinalis* resemble those of *E. retroflexa*, with which there has been much confusion in identification. Immature achenes somewhat resemble those of the *Pauciflorae*, in which group I previously and incorrectly placed the plants. *E. crinalis* resembles *E. Rabenii*, but is easily recognized by the brown (not purple) spikelets and coarse rhizomes.

84. *E. RABENII* Boeckl. (PL. 545, FIG. 3). Perennial, from a slender, extensively-creeping rhizome bearing appressed purple scales; culms capillary, subflexuous, 8–40 cm. long, quadrangular-sulcate: sheaths purple, appressed, subacute and slightly spreading at the apex: spikelets broadly ovate-lanceolate, 5–8-flowered, 2–3 mm. long: scales divaricate, ovate, acute, purplish-brown, sometimes greenish on the keel: stamens 2; anthers 0.5 mm. long: style 3-fid: achene ovate, trigonous with somewhat costate angles, lightly cancellate with obscure pitting, brownish-yellow; style-base pyramidal, acute, dark brown, trilobed with prominent basal margin; bristles short, slender, lustrous brown.—Kjoeb. Vidensk. Meddel. 1871: 149 (1871). BRAZIL: without further locality, Raben (TYPE, Cop).—URUGUAY: Carrasco, Montevideo, in paludosis dunarum, Osten no. 22477 (B).

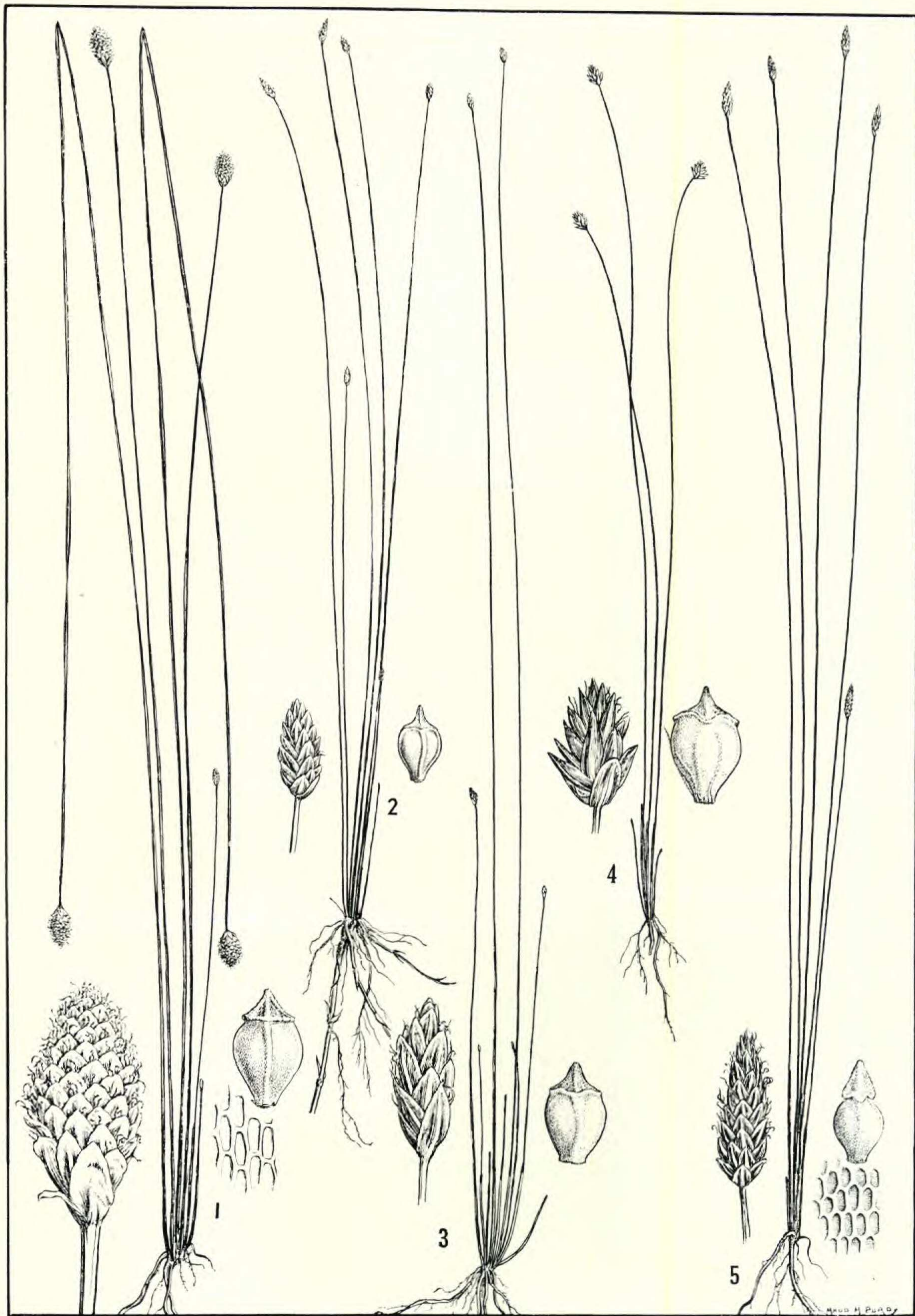
The type is without rootstocks, and these I have described from a collection given to me by the late Cornelio Osten. *E. Rabenii* has the appearance of typical *E. capitata* (*E. tenuis*) as previously treated by me. The achenes of Osten no. 22477, being immature, are whitened and smaller than in the type.

85. *E. ALBIBRACTEATA* Nees & Meyen [MAP 40]; Svenson, RHODORA xxxi. 178 (1929). *E. nubigena* C. B. Clarke; Svenson, RHODORA xxxi. 179 (1929).

The type of *E. albibracteata* (hb. Berlin), from Lake Titicaca, has culms only 3 cm. long. The lowest scale of the spikelet is prominently whitened. Achenes are exactly 1.5 mm. long, golden-yellow with prominently-pitted, reticulate surface, obtuse outer angle, and brown style-base. At Kew the TYPE of *E. nubigena* is annotated by C. B. Clarke as "close to *E. (melanocephala) albibracteata*, but the mouth of the sheaths will not match, and the apex of the nut is very unusual." In this collection, the achenes (not quite mature) are 1 mm. long, with the three angles of the style-base slightly raised and apiculate. The illustration by Barros of Lorentz & Hieronymus no. 65 is identical with mine of Mandon no. 1414, both showing achenes evidently not mature. The sheet of *E. melanocephala* Desv. (TYPE, Paris) "Cordillera de Guanta (Coquimbo) . . . 3000 m." consists of ten clumps of specimens, 3-4 cm. tall, with small heads resembling those of *Venturi* no. 9454. In *E. albibracteata* the sheaths are variable, being for the most part inflated at the apex, but sometimes truncate with traces of a mucro. They emphasize the fact that the sheath-apex is not always a good basic character for classification of species in *Eleocharis*.

Additional citations: PERU: alt. 8400 ft., Yura [?], R. S. Williams no. 2571 (NY); Cuzco, A. S. Hitchcock no. 22493 (NY). ARGENTINA: Tumbaya, Jujuy, 2400 m., *Venturi* no. 6190 (US, B); Tafi, Tucuman, *Venturi* nos. 9454 (US, B) and 9049 (US, B); Chubut, 70° W. 45° S., Koslowsky no. 75 (K); Patagonia australis, Terr. Santa Cruz, in ripa lacusculi ad Richmond, Dusén no. 5471 (S). CHILE: in Andibus, prov. Coquimbo, Reed (K); Valdivia, Philippi (K).

The names *E. albibracteata* and *E. Lechleri* are being used indiscriminately for Patagonian and Chilean plants of more spongy texture than seen in typical *E. albibracteata*. These plants have pallid achenes when mature, with pitted, sharply-defined reticulation. They probably represent a distinct species, without much doubt already described by Philippi. That they are not *E. Lechleri* is evident from Boeckeler's description of the achene of that species as *testaceous* (i.e. brick-



ELEOCHARIS (habit $\times \frac{1}{2}$, spikelets $\times 2\frac{1}{2}$, achenes $\times 10$). FIG. 1, *E. nudipes*. FIG. 2, *E. crinalis*. FIG. 3, *E. viridans*. FIG. 4, *E. pachycarpa*. FIG. 5, *E. dunensis*.



ELEOCHARIS (habit $\times \frac{1}{2}$, spikelets $\times 2\frac{1}{2}$, achenes $\times 10$). FIG. 1, *E. MINARUM*. FIG. 2, *E. GLAZIOVIANA*. FIG. 3, *E. RABENII*. FIG. 4, *E. URBANI*. FIG. 5, *E. LEUCOCARPA*. FIG. 6, *E. GLAUCO-VIRENS*. FIG. 7, *E. LOEFGRENIANA*. FIG. 8, *E. CHRYSOCARPA*.

colored) and the style-base "*minimo conico, basi satis dilatate incumbente.*" Boeckeler's type of *E. Lechleri* consisted of dwarf plants with capillary culms $1\frac{1}{2}$ – $1\frac{1}{2}$ inches high, growing near springs in the Cordillera of Ranco [south of Valdivia], Chile. Some of the specimens cited by me from Johnston's collections, and probably all from Patagonia, belong to the species with pallid achenes, and the following definitely so: CHILE: Nubla, *Pennell* no. 12409 (NY). ARGENTINA: Tehuelches, Terr. Santa Cruz, *Donat* no. 67 (G, NY); Patagonia, 50–53°, *Moreno & Tonino* nos. 404 (NY), 405 (NY). (The map also includes stations cited by Barros under *E. albibracteata*).

86. *E. MONTEVIDENSIS* Kunth, Enum. ii. 144 (1837) [MAP 38]; Steudel, Syn. Cyp. 76 (1855); Barros, Anales Mus. Hist. Nat. Buenos Aires, xxiv. 478, fig. 27 (1928). *Limnochloa montevidensis* Nees in Mart. Fl. Bras. ii¹. 99 (1842). *E. arenicola* Torr. in Engelm. & Gray, Boston Jour. Nat. Hist. v. 237 (1847); Svenson, RHODORA xxxiv. 219 (1932). *E. montana* sensu Britton in Abrams, Fl. Pacific States i. 266, fig. 636 (1923); not (HBK) R. & S. *H. montana* (HBK) R. & S. ssp. *montevidensis* Osten, Anales Mus. Hist. Nat. Montevideo, ser. 2^a, iii. 183 (1932).—Additional citations: MEXICO: Tecate River, Lower California, *Mearns* no. 3786 (NY); Ensenada, Baja California, *Wiggins & Demaree* nos. 4750 (NY), 4772 (NY); Vera Cruz, *F. Mueller* no. 2149 (NY); Durango, *E. Palmer* no. 99 in 1896 (NY); in fossis, Guanajuato, *Hartweg* no. 241 (NY). TEXAS: Dallas, *Reverchon* no. 1004 (NY); Fort Worth, *Ruth* no. 147 (NY); Horseshoe Lake, Jackson Co., *Drushel* no. 9015 (B); Neuces Bay, *Ravenel* no. 70 (NY); Belknap, *S. Hayes* in 1858 (NY); Guadalupe Mts., Culberson Co., *Moore & Steyermark* no. 3508 (B, NY); Mouth of Rio Grande, *Runyon* in 1926 (NY); Strickland Spring, Kinney Co., *Mearns* no. 1363 (NY). N. MEXICO: Ute Park, *Standley* no. 13969 (NY). ARIZONA: Chiricahua Mts., *Goodman & Hitchcock* no. 1219 (B, NY). CALIFORNIA: San Gabriel Mts., Los Angeles Co., *L. C. Wheeler* no. 2592 (B). ARGENTINA: Candelaria, Salta, *Venturi* no. 9486 (G); Dept. Leales, Tucuman, *Venturi* no. 392 (G); Dept. Capital, Tucuman, *Venturi* no. 2276 (B, US); Duraquito, Tucuman, *Venturi* no. 1548 (B, US); Cordoba, *Kneucker* no. 157 (G). URUGUAY: Montevideo, *Humboldt* ex Sellow (TYPE, Berlin, Kunth hb. no. 3205); Montevideo, *Herter* no. 604 (NY); Barra Santa Lucia, San José, *Osten* no. 22309 (B).

The type is identical with *E. arenicola* from Texas.

87. *E. NODULOSA* (Roth) Schultes; Svenson, RHODORA xxxix. 255 (1937). *E. chrysocarpa* Boeckl. (PL. 545, FIG. 8).

E. NODULOSA var. *ANGULATA* Svenson [MAP 36]. Perennial from a thickened, spongy, horizontal rootstock with prominent ovate scales; culms erect, 0.5–3 dm. high, 1–2 mm. broad, terete, striate, obscurely septate; sheaths reddish, truncate and mucronate at the apex: spike-